

**U.S.-MEXICO AGRICUTLURAL TRADE
AND MEXICAN AGRICULTURE:
*LINKAGES AND PROSPECTS UNDER
A FREE TRADE AGREEMENT***

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Texas Agricultural Market Research Center (TAMRC) International Market Research Report No. IM-6-92, July 1992 by Mr. Kris B. Schulthies and Dr. Gary W. Williams, Texas Agricultural Market Research Center, Department of Agricultural Economics, Texas A&M University, College Station, Texas 77843-2124. This report draws heavily on the TAMRC U.S.-Mexico Free Trade Issues for Agriculture Research Reports series, IM-1-91 through IM-13-91. Please refer to the reference section for full citations.

ABSTRACT: A U.S.-Mexico FTA along with recent, historic changes in Mexican government policy affecting agriculture are likely to have important implications for agriculture far beyond any impacts on trade flows between the two countries. After providing some background on U.S.-Mexico agricultural commodity trade flows and barriers, this paper discusses the future prospects of agricultural trade between the two countries with and without an FTA. Then, the interdependent relationship between likely changes in U.S.-Mexico agricultural trade over time and key Mexican agricultural and agribusiness forces is explored in some detail. These forces include Mexican agricultural policies, Mexican farm size and structure, Mexican agricultural labor, Mexican infrastructure, foreign direct investment (FDI) in Mexican agricultural production and processing, Mexican agribusiness strategy, and technological change in Mexican agriculture.

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U.S./MEXICO AGRICULTURAL TRADE AND MEXICAN AGRICULTURE: LINKAGES AND PROSPECTS UNDER A FREE TRADE AGREEMENT

EXECUTIVE SUMMARY

A U.S.-Mexico free trade agreement (FTA) along with recent, historic changes in Mexican government policy affecting agriculture are likely to have important implications for agriculture far beyond any impacts on trade flows between the two countries. After providing some background on U.S.-Mexico agricultural commodity trade flows and barriers, this paper discusses the future prospects of agricultural trade between the two countries with and without an FTA. Then, the interdependent relationship between likely changes in U.S.-Mexico agricultural trade over time and key Mexican agricultural and agribusiness forces is explored in some detail. These forces include Mexican agricultural policies, Mexican farm size and structure, Mexican agricultural labor, Mexican infrastructure, foreign direct investment (FDI) in Mexican agricultural production and processing, Mexican agribusiness strategy, and technological change in Mexican agriculture. The salient conclusions from each of these parts of the paper are summarized here.

U.S.-Mexico Agricultural Commodity Flows and Trade Barriers

As background to a discussion of the likely effects of U.S.-Mexico agricultural trade, a brief overview of Mexican agriculture is provided followed by a discussion of current trends in U.S.-Mexico agricultural trade and the major barriers currently impeding the free flow of agricultural commodities between the two countries.

Overview of Mexican Agriculture: In many ways, the evolution of U.S.-Mexico agricultural trade over time is a reflection of the dynamics of Mexican economic policy as defined by the particular characteristics of the Mexican agricultural sector. Key aspects of Mexican agriculture that have helped shape U.S.-Mexico agricultural trade and discussed in detail in the report include: (1) the role of agriculture in the overall Mexican economy, (2) the pattern and composition of Mexican agricultural production, (3) the Mexican climate and agricultural resource base, and (4) the Mexican land tenure system.

Current Trends in U.S.-Mexico Agricultural Trade: Mexico is the third largest foreign importer of U.S. agricultural products behind Japan and Canada and the second largest foreign supplier of agricultural products to the U.S. behind Canada. The U.S., however, is far more important to Mexico as an agricultural trading partner, both as a supplier and a purchaser, than is Mexico to the U.S. Mexico purchased just 6% of total U.S. agricultural exports in 1989. On the other hand, the U.S. purchased 79% of all Mexican agricultural exports in that year.

- Meat and meat products were the largest U.S. agricultural export to Mexico in 1990 (in U.S. dollar value) but Mexico accounted for only 9% of U.S. meat and meat product exports in that year. Mexico also took only 17% of U.S. seed exports in 1990, 22% of U.S. live animal exports, and 22% of U.S. dairy product exports. Sorghum is the major commodity for which Mexico dominates U.S. exports. Mexico took 43% of U.S. sorghum exports in 1990.

- On the import side, Mexico is also only one of many foreign suppliers of U.S. agricultural commodity imports. Even for horticultural products, the largest U.S. agricultural import from Mexico, only slightly over a third of U.S. imports came from Mexico in 1990. Only 20% of U.S. coffee imports came from Mexico, 36% of U.S. live animal imports, and 10% of U.S. fruit juice imports.
- In contrast, about 95% of Mexican horticultural product exports went to the U.S. in 1990, 75% of Mexican coffee exports, 50% of Mexican live animal exports, 98% of Mexican malted beverage (beer) exports, and 56% of Mexican sugar exports.
- Likewise, the U.S. accounts for a dominant share of the major agricultural commodities imported by Mexico. The U.S. supplied 95% of the grains imported by Mexico, 80% of the oilseed imports, 44% of the dairy product imports, 92% of the vegetable oil imports, and 81% of all other agricultural products imported in 1990.

Barriers to U.S.-Mexico Agricultural Trade: Both the U.S. and Mexico utilize a wide variety of policy instruments that directly and indirectly affect agricultural trade between the two countries.

- Principal U.S. agricultural policies that directly affect agricultural commodity trade with Mexico include export subsidies of various types, import tariffs, particularly for fruits and vegetables, and section 22 import quotas primarily for sugar, cotton, and beef.
- A number of other U.S. policies and regulations intended to achieve largely unrelated objectives also affect U.S.-Mexico agricultural trade, including target prices and deficiency payments primarily for grains and cotton, sanitary and phytosanitary regulations, animal health regulations, chemical use/food residue/insect and disease control regulations, and others. Mexican fruit and vegetable producers also complain that U.S. marketing orders restrict the free flow of their commodities to the U.S.
- Principal Mexican agricultural policies affecting trade with the U.S. include guaranteed prices for basic crops like corn and beans and associated import licensing requirements, import tariffs on various commodities, and a few minor export taxes. Although Mexico also has many health, sanitary, chemical use, and related regulations, they are generally less stringent than those in the U.S. and, therefore, not considered to be directly trade restricting.

Future Prospects for U.S.-Mexico Agricultural Trade

Unilateral moves by Mexico to open its economy and reduce trade barriers have already contributed to a significant increase in U.S.-Mexico agricultural trade. Undoubtedly, a U.S.-Mexico FTA would further the ongoing process of liberalization and push the volumes and composition of U.S.-Mexico agricultural trade in directions consistent with current trends with some exceptions. The prospects for future U.S.-Mexico agricultural trade are analyzed assuming first that current trade trends prevail and no further liberalization of agricultural trade between the two countries occurs and then that a U.S.-Mexico FTA eliminates existing agricultural trade barriers.

U.S.-Mexico Agricultural Trade Prospects Without an FTA: Given the unilateral trade liberalization already undertaken by Mexico and the rapid course towards privatization set by the Salinas Administration, current trends in agricultural trade growth would likely continue even without an FTA. The future pattern of U.S.-Mexico agricultural commodity trade in this case would continue

to reflect the current competitive advantages of each country in agriculture. A number of factors will likely constrain the rate at which trade develops between the two countries and define the pattern of trade as it develops, including (1) the pace of economic development in Mexico, (2) the level of investment in Mexican production, marketing, storage, transportation, and distribution capacity, technology, and supporting infrastructure, (3) the effect of recent changes in the Mexican land tenure system on production efficiency, and (4) possible changes in Mexican policies and laws from trucking regulations to different commodity standards and regulations than in the U.S.

Mexico currently appears to have a competitive advantage in the production and export of at least feeder cattle, many horticultural products, and citrus. The U.S., on the other hand, appears to currently enjoy a competitive advantage in the production and export of breeding and slaughter livestock, dairy products, meat (particularly beef), most feed and food grains, and possibly cotton. Without an FTA, most of the impetus for continued growth in U.S.-Mexico agricultural trade would have to come from continued overall economic and per capita income growth as a result of either increased market efficiency as economic restructuring continues in Mexico and/or increased foreign capital investments in productive activities in the Mexican economy. The prospects for U.S.-Mexico trade in specific agricultural products without an FTA would likely include the following:

- **Livestock and livestock products:** The Mexican cattle industry would likely continue to specialize in the production and export of feeder cattle to the U.S. The U.S. cattle industry would tend to specialize in exporting beef and beef products to Mexico. Despite some conflicting Mexican dairy policy changes, concessional exports of U.S. government non-fat dry milk (NFDM) stocks to Mexico will likely continue to restrain growth in the Mexican dairy industry and stimulate Mexican imports of U.S. dairy products. Mexican demand for U.S. breeding hogs would continue in the short term, providing the basis for continued growth in the Mexican hog industry. Mexican imports of U.S. pork would likely continue growing over the short run and then face increasingly tough competition from domestic Mexican producers. Increasing supplies of cheap feedgrains from the U.S. coupled with restrictive poultry import barriers would provide an increasing investment and growth incentive to the Mexican poultry industry and impair the access of U.S. producers to Mexican markets except through investment in poultry operations in Mexico. Mexican imports of old ewes and rams would likely continue creating competition for Mexican sheep and goat producers.
- **Grains:** Prospects for U.S. feed grain exports to Mexico would depend on the prospects for growth in Mexican feed grain, livestock feeding, and dairy industries which depend on the growth in demand for meat and dairy products in Mexico. Prospects for growth in Mexican grain production are dim following the recent elimination of government import restrictions, price supports, and input subsidies for most grains except corn and beans and the limited availability of water and irrigation infrastructure. Current recapitalization of the Mexican cattle and hog industries and increasing investment in the Mexican poultry industry along with improving Mexican meat consumption would likely necessitate increasing U.S. exports of feedgrains to Mexico through the 1990s. Growth in U.S. corn exports to Mexico would likely continue to be restricted by protective government policies.
- **Horticultural products:** Mexico has captured an increasing share of the U.S. market for fresh fruits and vegetables, a trend that would likely continue as Mexican farmers realized increased planting options on their land from adjustments in both Mexican agricultural policy and the land tenure system. Vegetable and fruit production would likely become a more attractive alternative as the Mexican government continues to decrease input and price subsidies for basic crops and to increase the promotion of export-oriented crops. Mexican fruit and vegetable exports to the U.S. would still be limited by U.S. tariffs. U.S. exports of some horticultural products to Mexico would likely continue growing but would be somewhat

constrained by four factors: (1) Mexican import tariffs, (2) investments in Mexican production and processing technology that would boost production yields and processing efficiency, (3) continued encroachment of the Mexican production season into the U.S. production and marketing season, and (4) continued U.S. weather problems that have already taken a toll on U.S. production area and capacity, particularly for citrus crops.

- **Cotton:** The prospects for the volume and pattern of U.S.-Mexico cotton trade depend primarily on government policies and the demand for cotton by the respective textile industries. Continued investment in Mexican textile manufacturing capacity, either as a relocation from higher labor cost areas or as additional world capacity, would continue to spur Mexican demand for U.S.-produced cotton. U.S. imports of Mexican cotton, however, would not likely change much because of the restrictive U.S. import quota.

U.S.-Mexico Agricultural Trade Prospects With an FTA: The likely impacts of an FTA on U.S.-Mexico agricultural trade depend crucially on what the agreement includes. The removal of only tariff barriers, for example, would likely have a small to moderate impact on trade in most agricultural commodities between the U.S. and Mexico for three reasons: (1) Mexico has already unilaterally eliminated or significantly reduced most tariffs on agricultural commodity imports, (2) U.S. tariffs on most agricultural commodity imports from Mexico, except fruits and vegetables, are already low or zero, and (3) the most restrictive barriers to agricultural commodity trade between the two countries are non-tariff barriers, including quantitative import controls (Mexican import licensing regulations and U.S. import quotas), internal producer price supports and subsidies, and a divergence between U.S. and Mexican commodity grades and standards, chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and similar regulations. The following analysis of the likely impacts of an FTA on U.S.-Mexico trade in specific agricultural commodities assumes that only tariff and quantitative restrictions are removed because the U.S. will likely reserve discussion of internal price supports for the GATT negotiations and because the issues relating to harmonization of agriculture and food standards, grades, and other regulations are sufficiently intractable that agreement on many of those issues is not likely in the current negotiations.

- **Horticultural products:** In the short run, U.S imports of Mexican horticultural products would likely increase above levels that would otherwise be expected, including traditionally traded goods and high-dutied products such as asparagus, tomatoes, lettuce, bell peppers, cucumbers, green chilies, squash, avocados, grapes, guavas, and mangoes. Imports of other Mexican horticultural products, such as broccoli, cauliflower, cantaloupe, eggplant, onions, and okra, might also tend to increase although Mexico is apparently less competitive with the U.S. in these products on a cost of production per unit basis. Short-run growth in U.S. exports to Mexico would be expected in products that are less perishable, particularly temperate-climate products such as potatoes, apples, pears, peaches, onions, and processed foods such as dried leguminous vegetables and corn. Mexican economic growth, however, could generate sufficient growth in real per capita incomes and demand in Mexico over time to outpace the ability of the Mexican fruit and vegetable industry to supply the growing markets for fruits and vegetables in both the U.S. and Mexico. In this case, an FTA could reduce the supply of Mexican fruit and vegetables available for export to the U.S. and even spur Mexican demand for U.S.-produced fruits and vegetables. Without substantially increased public investment in infrastructure and increased foreign and domestic investment in Mexican fruit and vegetable production and processing capacity and technology, however, an FTA could simply lead to a long-run continuation of the likely short-run increases in U.S.-Mexico trade in fruit and vegetables as constrained by seasonal factors and relative differences in technology, production capacity, infrastructure, etc.

- **Citrus and citrus products:** Because U.S. import tariffs on citrus and citrus product are relatively low, an FTA would likely have only a small additional impact on U.S. citrus imports from Mexico above what would already be expected without an FTA. Non-tariff barriers such as phytosanitary regulations to control the spread of insects, particularly the Mexican fruit fly, and pathogens harmful to citrus, and differences in other grades and standards and food safety regulations will continue to be a major constraint on fresh citrus imports from Mexico into the U.S. An FTA could provide an incentive to expand production onto idle acreage in Mexico given significant economic growth and increased domestic citrus demand. More citrus could then also be available for export to the U.S. Increased capital investments in Mexican citrus processing facilities as a result of an FTA could boost U.S. orange juice imports from Mexico. U.S. exports of citrus and citrus products to Mexico would not likely increase to any extent.
- **Grains:** Mexico has already eliminated most of its tariff and non-tariff barriers on grain imports except import licenses for corn. Hence, an FTA would likely have a relatively small direct impact on total U.S. grain exports and prices over what might be expected anyway except for corn. Most likely, however, Mexico will refuse to dismantle the corn import licensing system. Any economic growth achieved through an FTA, however, could have a sizeable impact on U.S. exports of food grains like wheat. Also, increased demand for meat in Mexico could stimulate Mexican livestock feeding and import demand for U.S. sorghum and other feedgrains. Unilateral reduction of Mexican trade barriers and production subsidies has already reduced the competitiveness of the Mexican grain industry. An FTA would continue the pressure for adjustment in the Mexican grain sector.
- **Livestock and meat:** An elimination of the already low Mexican export tax and U.S. import tariff on feeder cattle trade would likely result in only a small increase in U.S. imports of Mexican feeder cattle over what would be expected without an FTA. Any FTA-induced, long-term economic growth achieved, however, would boost Mexican demand for meat and provide incentives for both additional U.S. meat exports to Mexico and the diversion of Mexican feeder cattle exports into domestic meat markets to meet the growing demand. The final outcome will depend on the growth achieved in Mexican meat demand and the way in which Mexican cattle producers respond to the current decapitalization in the industry. The most likely long-run FTA result, however, is that the Mexican cattle industry would continue to specialize in feeder cattle production for export to the U.S. for several reasons: (1) although feed costs would likely be lower in Mexico, the relative proximity of U.S. cattle feeders to feed supplies would continue to provide them with a relative advantage over Mexican feeders, particularly if Mexican corn import restrictions are not lifted, (2) recent changes in Mexican land tenure laws could provide an incentive to shift to extensive production practices like livestock raising on Mexican land formerly intensively cropped by *ejidatarios*, providing additional incentive to raise feeder cattle in Mexico, (3) the Mexican transportation, marketing, storage, and distribution infrastructure is severely underdeveloped making access by Mexican feeders to U.S. feedgrain supplies cumbersome and costly, (4) the U.S. cattle industry is already hampered with excess feeding and packing capacity so that expansion of U.S. slaughter and processed beef supplies to meet increased demand for beef in the U.S. or Mexico would likely be more cost efficient than investments in new capacity in Mexico to meet that demand, and (5) Mexican beef price ceilings will continue to discourage investments in Mexican feeding and packing facilities and encourage Mexican exports of feeder cattle. Some incentive may exist to grass-fatten and slaughter Mexican steers in Mexico for sale in the domestic market or in the U.S. An increase in Mexican grass-fed beef exports to the U.S. would mainly displace U.S. grass-fed beef imports from Australia.

- **Dairy products:** Mexico has already substantially reduced dairy product import barriers. Thus, much of the impact of an FTA on the dairy industries of each country would depend on how other issues such as producer and consumer subsidies and milk safety regulations are treated as well as how consumer demand for milk is affected. The main impact of a U.S.-Mexico FTA on U.S. dairy exports would be through the food demand expansion effects of any economic growth achieved in Mexico as a result of an FTA. Even given an increase in Mexican milk output at an annual rate of 5% (the approximate average annual growth rate over the last 30 years), annual Mexican consumption would far outstrip production if economic growth in Mexico pushed Mexican per capita milk consumption levels up to U.S. levels by the year 2000. An increase in Mexican incomes would likely also shift the composition of dairy product demand away from low-quality basic products such as NFDM and filled cheeses to specialty products like ice cream and fine cheeses.
- **Cotton:** Complete removal of U.S. tariffs and quotas (along with the resolution of current phytosanitary constraints) would likely lead to an increase in U.S imports of cotton from Mexico. The additional imports, however, would not likely amount to a significant percentage of the U.S. cotton supply.

The Linkages Between U.S.-Mexico Agricultural Trade and Mexican Agriculture and Agribusiness

Agricultural trade between the U.S. and Mexico will likely continue growing with or without an FTA. That growth, however, will occur within the confines of the existing framework of Mexican institutions, infrastructure, and government policy and other relevant aspects of the Mexican economic and political system, particularly those related to agriculture and agribusiness. Significant adjustments in many of those forces may also be dictated by continuing growth in U.S.-Mexico agricultural trade. Some of the more salient of those forces include: (1) Mexican agricultural policy strategy, (2) Mexican farm size and structure, (3) Mexican agricultural labor, (4) Mexican infrastructure, (5) foreign direct investment in Mexican agriculture and agribusiness, (6) Mexican agribusiness strategy, and (7) technological change in Mexican agriculture.

Mexican agricultural policy strategy for agriculture: The nature, extent, and composition of future U.S.-Mexico agricultural trade will be defined in large part by the success of the Mexican government strategy for the agricultural and agribusiness sector. At the same time, continued growth in agricultural trade between the two countries will likely force continued evolution of Mexican agricultural policy. The Mexican government plan for agriculture and agribusiness outlines several key strategic targets within Mexico, including: (1) the land tenure system, (2) agricultural inputs, (3) agricultural credit, (4) water resources, (5) domestic and international marketing and prices, (6) agribusiness and rural industries, and (7) the roles of Mexican parastatals and producer associations in agricultural processing and marketing.

- **The land tenure system:** Pressure from growing U.S.-Mexico agricultural trade is forcing adjustments in the Mexican agricultural sector and agricultural policies to eliminate institutionalized inefficiencies created over many decades through the Mexican land tenure system. If effectively implemented, the net impact of recent land reform legislation could be an incentive for more efficient, larger-scale farms in Mexico at the expense of traditional, less efficient *ejidos*. Farm size will likely increase and the total number of farmers will likely decrease since *ejidatarios* will have the option to sell their land. The size and number of corporate-owned farms will probably increase as well as the number of legal joint ventures with foreign companies. *Ejidatarios* will be able to legally respond to a decline in the profitability of crop relative to livestock production in Mexico by converting crop acreage to

pasture. U.S. investors will be able to legally set up agricultural operations and the more efficient, private Mexican farming operations will be able to legally expand their production in Mexico through buying or renting *ejido* land. The number of hectares an individual or corporation can own will still be quite restricted by law, however.

- **Agricultural inputs:** The Mexican strategy to eliminate inefficiencies in the agricultural sector has included the elimination of production input subsidies on water, electricity, fertilizer, transportation, crop insurance, and credit as well as balanced feed subsidies to livestock producers. The consequence has been a substantial increase in Mexican agricultural production costs over the last two years. The import licensing requirements for most agricultural inputs have also been removed, however. The Mexican government has also announced its intention to reduce the production and use of potentially harmful and/or environmentally damaging agricultural chemicals. The government is also promoting the development and use of disease, pest, and drought-resistant crop varieties.
- **Agricultural credit:** The Mexican government is improving the availability of subsidized credit to farmers with high productive potential and limiting the level previously available to small farmers. The net effect is likely to be even less availability of funding for *ejidatarios* and other small farmers and an incentive for larger scale farming in Mexico, particularly those operations oriented towards exporting to the U.S.
- **Water resources:** Both public and private efforts are aimed at improving the availability and efficiency of irrigation resources in water-short areas in Mexico. The Mexican government has announced plans to improve the efficiency of existing irrigation projects using funds obtained by restructuring the user rate system. Water users will be charged a rate based on usage that more closely reflects the actual cost of development and distribution. Metering systems will be installed on farms using water from public irrigation projects to monitor usage. The Mexican government also plans to gradually turn over the operation and management of irrigation systems to the water users.
- **Domestic and international marketing and prices:** The Mexican government is reducing its role as a major player in agricultural markets to primarily one of a regulatory agency through: (1) new anti-trust legislation, (2) increased decentralization of markets, (3) the creation of a commodity exchange, (4) privatization of the transportation system, (5) reduced international trade barriers, and (6) agricultural export promotion.
- **Agribusiness and rural industries:** The Mexican government is limiting the support of the Mexican financial system for plant refurbishing and modernization projects to only those deemed financially viable. The infrastructure necessary to support plant modernization, such as roads and bridges, is targeted for increased public investment.
- **The roles of parastatals and producer associations in agricultural processing and marketing:** The Mexican government is deregulating and privatizing agricultural parastatals and promoting private producer cooperatives. Some of the authority and corresponding decision-making responsibility is being turned over to state and local governments. Private producer cooperatives and committees are being formed to assume some of the market organization responsibilities that government parastatals have traditionally performed.

Mexican farm size and structure: More open markets and increased agricultural trade are forcing the evolution of the Mexican agricultural sector away from traditional, subsistence farming towards larger-scale, commercial farming. Commercial farms are more highly mechanized and

productive than their subsistence counterparts which use more traditional methods of farming. Commercial farms utilize more capital, certified or improved seed, fertilizers and agricultural chemicals, and better methods of marketing. Traditional agriculture farms, in general, are *ejidos*, many of which have low quality land and are separated from communication channels with poor access to commercial marketing channels.

Mexican agricultural labor: Recent reductions in the level of government support for Mexican agriculture and the likelihood of continued growth in U.S.-Mexico agricultural trade, with or without an FTA, will require adjustments in the use and level of labor employed in the Mexican agricultural sector. Increased imports of grains and other commodities from the U.S. will force Mexican farm labor to find alternative employment within or outside the Mexican agricultural sector. Where displaced farmers and agricultural workers relocate, however, will depend on several important factors including growth in productive activities in other Mexican agricultural sectors such as fruits and vegetables, growth in other sectors of the Mexican economy, growth in the U.S. economy, and changes in U.S. immigration laws. Increased migration of undocumented workers to the U.S. will likely increase without significant economic growth in the non-agricultural sectors in Mexico to absorb the displaced workers. Recent research indicates that the major displacement of Mexican farm labor would occur if the FTA requires Mexico to liberalize corn imports and eliminate corn price supports and production subsidies. More than 2 million *ejidatarios* produce corn as their principal crop and over 90% of the *ejidos* produce at least some corn. Consequently, reductions in price supports and input subsidies for corn in Mexico together with increased imports of corn from the U.S. would force a large rural to urban agricultural labor migration and an almost equal displacement of surplus Mexican urban labor to the U.S. in search of employment.

Mexican infrastructure: The Mexican production, transportation, marketing, storage, and distribution infrastructure is severely underdeveloped relative to those of the U.S. and other developed countries and to the growing requirements of the Mexican economy to facilitate the current transition to more open markets. Unless significant public and private investments are made, the outdated and inefficient Mexican infrastructure will constrain potential growth of Mexican agricultural exports to the U.S. as well as of U.S. agricultural exports to Mexico. The Mexican transportation infrastructure, in particular, suffers from inadequate investment and inefficient public regulation and management. Underinvestment has occurred in virtually all Mexican transportation services and related infrastructure in Mexico including highways, railroads, deep water ports, and airports and related services. Whether or not the Mexican transportation system and related infrastructure continue to restrain growth in U.S.-Mexico agricultural trade depends on the extent to which three major problems are resolved: (1) the access of the U.S. trucking industry to Mexico, (2) administrative constraints at border crossings, and (3) the shortage of investment capital to modernize and expand the Mexican transportation infrastructure.

Foreign direct investment (FDI) in Mexican agriculture and agribusiness: Recent changes in Mexican investment laws have eased Mexican restrictions on foreign ownership of Mexican businesses and land leading to a sharp increase in FDI in the Mexican economy. FDI in the Mexican agricultural production and food processing sectors has also increased but still only account for about 0.1% and 1.8%, respectively, of overall FDI in Mexico. Continued FDI growth in Mexican agricultural production and processing will depend largely on foreign investor confidence in the security and potential returns on their investments.

For a given potential foreign investor considering whether or not to invest in particular agricultural or food processing activities in Mexico, the investment decision depends on the extent to which the potential perceived benefits outweigh the costs. Currently, the chief attractions for foreign direct investment in Mexican agriculture and agribusiness include low labor costs, relatively

looser environmental, labor, chemical use, and other regulations, and proximity to large and growing Mexican urban centers. The costs involved include the inadequate, underdeveloped Mexican *infrastructure*, the low current level of per capita consumer purchasing power in Mexico relative to levels in the U.S. and other developed countries which limits market demand, the relatively inefficient and unstable political system in Mexico, and the difficult, cumbersome legal system that makes contract enforcement difficult in Mexico. A U.S.-Mexico FTA would likely reduce many of the costs of investing capital in Mexican agriculture and agribusiness over the long run.

Even though U.S. processed food exports to Mexico have increased in recent years, many U.S. firms are opting for direct investment strategies to take advantage of the growing market in Mexico. U.S. food processors will likely continue to prefer direct investment strategies over exports to increase their presence in the Mexican market. There are some concerns that growing U.S.-Mexico trade and integration is creating an incentive for U.S. firms to relocate their operations to Mexico to lower their costs of the production with the intention of shipping their products back to the U.S. for sale. With some exceptions, however, sales of U.S. food processor affiliates in Mexico are directed primarily to local rather than U.S. markets. U.S. food processing firms investing in Mexico appear to be more concerned about Mexico as a potential market for their products rather than as a "platform" for their export sales back into the U.S.

Mexican agribusiness strategy: The current operational strategy of Mexican agribusiness involves a close relationship between Mexican affiliates of multinational corporations (MNCs) and privately owned Mexican-based agribusinesses with a high level of government involvement which has evolved over a number of years. Even without a U.S.-Mexico FTA, Mexican economic reforms, unilateral liberalization by Mexico, changes in Mexican investment, foreign ownership, and land tenure laws, and the enticings of the Mexican government will continue to lure U.S. food processors to Mexico through joint ventures or establishing Mexican affiliates. A U.S.-Mexico FTA will provide additional opportunities for continued investment by U.S.-based food processing firms in Mexico. Continued growth in Mexican markets, however, will be crucial if such U.S. investments are to continue. Increasing competition with MNCs has created some incentive for Mexican food processors to seek out joint venture opportunities with U.S.-based food processors, particularly since the majority of the competition is from Mexican affiliates of U.S. food processors rather than exports to Mexico from U.S. food processing plants. The role of the Mexican government in food processing has diminished substantially since 1989 through efforts to disincorporate, sell off, divest interest in, or restructure its food processing affiliates. The government, however, is maintaining its role in food wholesaling, retailing, and distribution.

Technological change in Mexican agriculture: Mexico is relatively labor-rich and land-poor suggesting that the optimum path for agricultural development in Mexico must involve innovations to relieve the land constraint and make more efficient use of labor. Mexico has historically opted for a political solution to the land constraint problem through land reform. The recent changes in the land tenure system suggest that the sacrifices of efficiency have apparently outweighed the perceived social welfare benefits of the system. As the *ejido* system undergoes adjustment to allow larger farm units, however, critically needed investments and technologies will be those that promote labor-intensive activities. Otherwise, massive agricultural labor displacement could be the result with all the attendant implications for unemployment and Mexican labor migration to the U.S. Mexico seriously underinvests in agricultural research and technology development programs, however, in terms of both fiscal and human resources, like most developing countries. Mexican public investments in agricultural science and technology declined precipitously in real terms by over 70% between 1980 and 1988 and represents only 15% of all Mexican government expenditures on science and technology. Although Mexico has over 70 public and private schools of higher education in agriculture, much of the agricultural research in Mexico is conducted at other public institutions.

Conclusions

This paper analyzes the likely future prospects for agricultural trade between the U.S. and Mexico with and without an FTA between the two countries. The interdependent relationship between the possible changes in U.S.-Mexico agricultural trade over time and key Mexican agricultural and agribusiness forces is also explored in some detail. The conclusions of the study were reached through a qualitative analysis of the current and historical information available primarily for U.S. and Mexican agricultural markets and trade. No attempt was made to empirically estimate the parameters representing economic behavior in U.S. or Mexican agricultural markets or to simulate the likely impacts of an FTA using a model of U.S.-Mexico agricultural trade. Consequently, the conclusions reached here should more properly be considered to be hypotheses in need of testing. Nevertheless, the findings provide at least the following general insights on the future prospects for U.S.-Mexico agricultural trade and key related Mexican agricultural and agribusiness forces.

- Unilateral trade liberalization by Mexico means that comparatively little remains to be liberalized so that a U.S.-Mexico FTA would likely stimulate little additional growth in trade of most agricultural commodities between the two countries at least in the short run.
- Most of the impetus for continued growth in U.S.-Mexico agricultural trade without an FTA would have to come from continued overall economic and per capita income growth in Mexico as a result of either increased market efficiencies as Mexican economic restructuring continues and/or increased foreign capital investments in productive activities in the Mexican economy. The future pattern of U.S.-Mexico agricultural commodity trade in this case would continue to reflect the current competitive advantages of each country in agriculture.
- Mexico currently appears to have a competitive advantage in the production and export of at least feeder cattle, many horticultural products, and citrus. The U.S., on the other hand, appears to currently enjoy a competitive advantage in the production and export of breeding and slaughter livestock, dairy products, meat (particularly beef), most feed and food grains, deciduous fruits, and possibly cotton.
- The removal of tariff barriers to U.S.-Mexico agricultural trade would likely have only a small to moderate impact on trade in most agricultural commodities between the two countries because Mexico has already unilaterally reduced most agricultural commodity import tariffs, most U.S. import tariffs are already low, and the most restrictive barriers to agricultural commodity trade between the two countries are non-tariff barriers.
- Only tariffs and some quantitative restrictions are likely to be eliminated as part of a U.S.-Mexico FTA because (1) the U.S. will likely reserve discussion of internal price supports for the GATT negotiations, (2) the issues relating to non-tariff barriers are sufficiently intractable that agreement on many of those issues is not likely in the current negotiations, and (3) several politically sensitive quantitative restrictions are not likely to be eliminated, such as Mexican corn import licenses and the U.S. section 22 import quotas.
- The extent of an FTA impact on the existing pattern of competitive advantage in U.S.-Mexico agricultural trade depends crucially on several factors, including not only the comprehensiveness of the agreement but also the impact of any FTA on Mexican economic growth and the influx of foreign investment capital.
- Future U.S.-Mexico agricultural trade will affect and be affected by the success of the Mexican government policy strategy for the Mexican agricultural and agribusiness sectors

regarding the land tenure system, agricultural inputs, agricultural credit, water resources, domestic and international marketing and prices, agribusiness and rural industries, and the roles of Mexican parastatals and producer associations in agricultural processing and marketing.

- If effectively implemented, the net impact of recent Mexican land reform legislation to eliminate institutionalized inefficiencies created over many decades through the Mexican land tenure system could provide an incentive for more efficient, larger-scale farms in Mexico at the expense of traditional, less efficient *ejidos*.
- Recent reductions in the level of government support for many Mexican agricultural commodities and the likelihood of continued growth in U.S.-Mexico agricultural trade, with or without an FTA, will likely require adjustments in the use and level of labor employed in the Mexican agricultural sector. In particular, an FTA that required Mexico to liberalize corn imports and eliminate corn price supports and production subsidies would likely result in massive migration of agricultural labor to urban centers in Mexico and an almost equal migration of surplus Mexican urban labor to the U.S. in search of employment.
- Unless significant public and private investments are made, the outdated and inefficient Mexican production, transportation, marketing, storage, and distribution infrastructure will constrain potential growth of Mexican agricultural exports to the U.S. as well as of U.S. agricultural exports to Mexico.
- Although FDI in the Mexican agricultural production and food processing sectors has increased somewhat in recent years, continued growth will depend largely on foreign investor confidence in the security and perceived potential returns on their investments.
- Even though U.S. processed food exports to Mexico have increased in recent years, most U.S. food processors will likely continue to prefer direct investment strategies over exports to increase their presence in the Mexican market either by forming joint ventures with Mexican firms or by establishing Mexican affiliates. In general, U.S. food processing firms investing in Mexico are more interested in the potential of the Mexican market for their products rather than in an opportunity to relocate facilities for export sales back into the U.S.
- An inflow of new investments and technologies will be critically needed to promote labor-intensive economic activities as U.S.-Mexico agricultural trade continues to grow. The Mexican government, however, continues to seriously underinvest in agricultural research and technology development programs in terms of both fiscal and human resources.

U.S.-MEXICO AGRICULTURAL TRADE AND MEXICAN AGRICULTURE: *LINKAGES AND PROSPECTS UNDER A FREE TRADE AGREEMENT*

In June 1990, U.S. President George Bush and Mexican President Carlos Salinas de Gortari agreed to strengthen U.S. and Mexican economic relations and improve the international competitiveness of each country through a reduction and/or elimination of existing barriers to U.S.-Mexico trade. In September 1990, President Bush formally requested authority from the U.S. Congress to negotiate a free trade agreement (FTA) with Mexico (USITC). In May 1991, the authority of the Bush Administration to negotiate international agreements ("fast-track" authority) was automatically extended for two years in the absence of a Congressional vote to the contrary. The FTA negotiating process began shortly thereafter and is currently well under way.

A U.S.-Mexico FTA along with recent, historic changes in Mexican government policy affecting agriculture are likely to have important implications for agriculture far beyond any impacts on trade flows between the two countries. After providing some background on U.S.-Mexico agricultural commodity trade flows and barriers, this paper discusses the future prospects of agricultural trade between the two countries with and without an FTA. Then, the interdependent relationship between likely changes in U.S.-Mexico agricultural trade over time and key Mexican agricultural and agribusiness forces is explored in some detail. These forces include Mexican agricultural policies, Mexican farm size and structure, Mexican agricultural labor, Mexican infrastructure, foreign direct investment (FDI) in Mexican agricultural production and processing, Mexican agribusiness strategy, and technological change in Mexican agriculture.

BACKGROUND ON U.S.-MEXICO AGRICULTURAL TRADE

An understanding of the likely effects of increasing integration of the U.S. and Mexican economies on U.S. agriculture through trade, whether or not an FTA is negotiated, requires an appreciation of the character and nature of agricultural trade between the two countries. As background to a discussion of the likely effects of U.S.-Mexico agricultural trade, this section first provides a brief overview of Mexican agriculture before considering current trends in U.S.-Mexico agricultural trade and then identifying the major barriers currently impeding the free flow of agricultural commodities between the two countries.

Overview of Mexican Agriculture

In many ways, the evolution of U.S.-Mexico agricultural trade over time is a reflection of the dynamics of Mexican economic policy as defined by the particular characteristics of the Mexican agricultural sector. Key aspects of Mexican agriculture that have helped shape U.S.-Mexico agricultural trade include: (1) the role of agriculture in the overall Mexican economy, (2) the pattern and composition of Mexican agricultural production, (3) the Mexican climate and agricultural resource base, and (4) the Mexican land tenure system.

The Role of Agriculture in the Mexican Economy

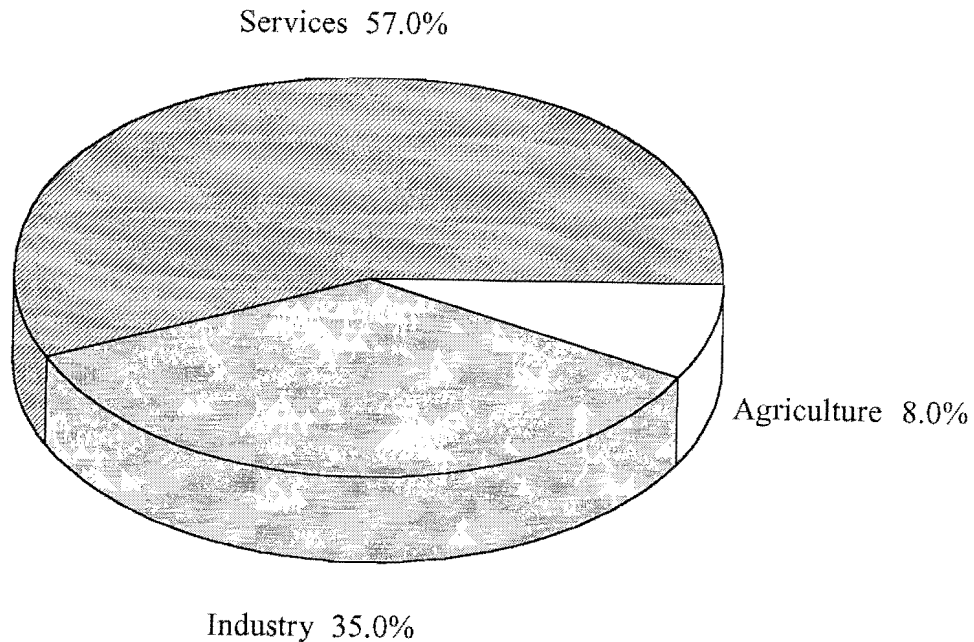
Agriculture plays a key role in the Mexican economy. As the fifth largest economic sector in Mexico, agriculture represents between 8% and 9% of the Mexican gross domestic product (GDP) (Figure 1). Crops accounted for 60.0% of the Mexican agricultural GDP in 1988 followed by livestock (32.6%) and forestry (5.4%) (Table 1). Nearly 30% of the Mexican work force is involved in agricultural production and 24% are employed in food- and fiber-related industries (World Bank).

Agricultural commodities account for 7% of merchandise exports and rank second only to petroleum in terms of top earners of foreign exchange (World Bank). Mexican imports have expanded in recent years, reflecting Mexican government efforts to control inflation and set a more stable currency. Although manufacturing and machinery are the major Mexican imports, raw food products and value-added foods represent 16% of all imports and are a growing component of Mexico's overall imports.

Despite its overall growth, agricultural production has not kept pace with population growth resulting in declining *per capita* real agricultural production (Table 2). Population growth and soaring rates of inflation have significantly cut average real per capita incomes in Mexico from \$US 3,000 in 1981 to \$US 1,770 in 1988. Even though average per capita incomes have recovered somewhat since 1988, rural income remains a small share of total income and will likely lag much behind in recovery (Rosson and Angel).

Mexican agricultural production, although generally not as capital-intensive as that of the United States, still relies heavily on credit to purchase inputs, so that the rate of interest is extremely

Figure 1: Mexico: Gross Domestic Product, 1987



Source: World Bank

important to the Mexican agricultural sector. Inflation, which is quite often high, causes dramatic changes in cost structures and demands for agricultural products, especially non-staple foods. With the trade sector so large, exchange rates become a critical linkage among the general economy, monetary and fiscal policies, and the agricultural sector.

Mexican Agricultural Commodity Production

The major agricultural commodities produced in Mexico include corn, wheat, dry beans, sorghum, sugar, beef and veal, pork, and dairy products (Table 3). Cereal crops, dry beans, sorghum,

Table 1: Mexico: Gross Domestic Product by Economic Activity, 1983-1988

Activity	1983	1984	1985	1986	1987	1988
----- million 1980 pesos -----						
Commercial Restaurants and Hotels	1,266,538	1,298,133	1,312,451	1,226,676	1,229,759	1,257,673
Manufacturing	943,549	990,856	1,051,109	995,848	1,024,736	1,055,656
Government and Social Services	879,614	901,188	899,434	892,996	893,842	898,068
Financial Services, Insurance, and Real Estate Rental	445,040	469,763	486,818	505,027	522,227	534,473
Agriculture, Forestry, and Fishing	390,605	401,120	416,163	404,841	410,405	394,358
Crops	228,318	235,515	248,555	235,540	242,008	228,679
Livestock	130,226	131,579	132,840	135,538	131,698	128,736
Forestry	19,129	19,833	20,505	19,771	20,771	21,225
Fishing and Hunting	12,932	14,193	14,263	13,992	15,928	15,700
Transportation and Communications	283,419	297,922	306,204	296,437	303,937	311,927
Construction	246,762	260,003	267,076	239,521	245,244	239,066
Minerals and Fossil Fuels	177,917	191,769	181,674	174,198	183,295	183,965
Electricity	54,806	57,548	62,331	64,598	67,025	71,210
Banking Services	-59,313	-62,252	-62,830	-64,421	-65,770	-67,642
Total	4,628,937	4,796,050	4,920,430	4,735,721	4,814,700	4,878,784

Source: INEGIb

oil crops, and industrial crops (coffee and sugar cane) are the predominant crops in Mexico in terms of land area under production. Corn occupies the most surface area of any crop, averaging 35% of the national area harvested in Mexico between 1985 and 1989, down from the 1980-1984 average of 41% (Table 4). The domestic production of corn, sorghum, and wheat has been insufficient to meet demand which has required significant imports in many years and contributed to an overall agricultural trade deficit.

Table 2: Mexico: Indices of Total and Per Capita Agricultural Production and Per Capita GNP, 1984-1990

Year	Total Agriculture Production	Agriculture Production Per Capita	GNP Per Capita
	(1980=100)	(1980=100)	\$ U.S.
1980	100.2	100.3	2,320
1981	105.9	103.4	3,000
1982	104.0	99.1	2,770
1983	108.4	100.9	2,290
1984	108.6	98.7	2,120
1985	112.6	99.9	2,180
1986	111.4	96.7	1,890
1987	111.1	94.3	1,780
1988	118.5	98.4	1,770
1989	117.2	95.2	2,080
1990	118.6	94.4	2,490
1991	123.5	96.2	

Source: USDAa

Table 3: Mexico: Supply and Demand for Major Agricultural Commodities, 1988-1989

	Corn	Beans	Wheat	Sorghum	Sugar	Beef & Veal	Pork	Dairy Products
<u>1988</u>	----- 1,000 mt -----							
Production	10,600	857	3,665	5,895	3,678	1,754	964	628
Imports	3,303	32	192	1,147	600	14	13	208
Total Supply	13,903	888	3,857	7,042	4,278	1,768	977	836
Domestic								
Disappearance	13,896	880	4,750	7,042	3,840	1,768	977	836
Exports	7	8	170	0	410	0	0	0
<u>1989</u>								
Production	10,945	586	4,374	4,807	3,000	2,140	773	628
Imports	3,649	2	428	2,665	1,000	20	27	250
Total Supply	14,594	588	4,802	7,472	4,000	2,160	800	878
Domestic								
Disappearance	14,592	588	4,772	7,472	3,950	2,159	800	878
Exports	2	0	230	0	5	1	0	0

Sources: Hall and Livas-Hernandez; Rosson, Schulthies, and White

Table 4: Mexico: Area Harvested of Major Crops, Five Year Averages, 1975-1989

	1975-1979 Average		1980-1984 Average		1985-1989 Average	
	1,000 ha	%	1,000 ha	%	1,000 ha	%
Total	15,855	100	17,046	100	19,517 ^a	100
Corn	6,744	43	6,915	41	6,756	35
Dry Beans	1,466	9	1,789	10	1,730	9
Wheat	745	5	897	5	1,093	6
Soybeans	284	2	334	2	391	2
Safflower	382	2	316	2	213	1
Sorghum	1,332	8	1,529	9	1,714	9
Barley	289	2	281	2	286	1
Alfalfa	213	1	247	1	258	1
Coffee	386	2	505	3	561	3
Sugar Cane	507	3	534	3	444	2
Other Crops ^b	3,505	22	3,699	22	6,071	31

^a 1984-1988 average.

^b Total minus sum of crops listed.

Source: SARHe; PEF; Hall and Livas-Hernandez

Fruits and vegetables are important in terms of their monetary value and their contribution to agricultural exports from Mexico. Nevertheless, the land area dedicated to fruit and vegetable production in Mexico represented only 3.5% of total cultivated land in 1989 (CNPH). The major fruits and vegetables produced in Mexico include tomatoes, strawberries, melons, bananas, lemons, and oranges. Mexico is probably least self-sufficient in the livestock and dairy sector. For example, Mexico imported powdered milk equal to 396 million gallons in 1989 (30% of national production) (PEF). Cattle, hogs, and chicken are the major livestock species of Mexico. Beef accounted for 43% of all meats produced in Mexico in 1986-1990, pork 30%, and chicken 24%. Mexico is nearly self-sufficient in egg production (Hall and Livas-Hernandez; USDAa).

Mexico is divided into eight distinct agricultural production regions (Figures 2 and 3). The eight regions and their respective states are: (1) Pacific North (Baja California Norte, Baja California Sur, Sonora, and Sinaloa); (2) Pacific Central (Nayarit, Jalisco, Colima, and Michoacan); (3) Pacific South (Guerrero, Oaxaca, and Chiapas); (4) North (Chihuahua, Coahuila, and Nuevo León); (5) North Central (Aguascalientes, Durango, San Luis Potosí, and Zacatecas); (6) Central (Guanaajuato,

Figure 2: Mexico by Region



Figure 3: Mexico by State



Table 5: Mexico: Irrigated and Rainfed Land Under Cultivation in Mexico by State, 1985

State ^a	Irrigated	Rainfed	Total
----- hectares -----			
Sinaloa	1,007,321	437,080	1,444,401
Sonora	806,804	15,845	822,649
Guanajuato	482,452	793,144	1,275,596
Tamaulipas	468,303	955,290	1,423,593
Michoacan	369,081	678,613	1,047,694
Chihuahua	329,521	772,030	1,101,551
Baja California N.	244,490	42,589	287,079
Jalisco	203,347	1,127,477	1,330,824
Coahuila	171,050	99,500	270,550
Durango	164,055	516,723	680,778
México	158,351	701,651	860,002
Puebla	121,710	848,666	970,376
Hidalgo	121,325	400,282	521,607
Nuevo Leon	102,818	158,868	261,686
Zacatecas	100,953	1,192,945	1,293,898
Colima	98,588	59,031	157,619
Baja California S.	75,089	0	75,089
Queretaro	71,741	128,229	199,970
Guerrero	71,067	666,542	737,609
Veracruz	63,723	1,114,638	1,178,361
Nayarit	63,500	227,780	291,280
Oaxaca	59,743	804,489	864,232
San Luis Potosí	57,797	415,506	473,303
Chiapas	55,856	1,021,716	1,077,572
Morelos	53,474	98,913	152,387
Aguascalientes	50,920	109,300	160,220
Tlaxcala	32,314	224,327	256,641
Quintana Roo	17,963	193,943	211,906
Yucatan	15,454	344,069	359,523
Campeche	2,111	134,568	136,679
Tabasco	0	214,372	214,372
Distrito Federal	0	33,295	33,295
Total	5,640,921	14,531,421	20,173,342

^a Ranked by irrigated hectares.

Source: SARHd

Hidalgo, Querétaro, México, Puebla, Morelos, Tlaxcala, and Distrito Federal); (7) Gulf (Tamaulipas, Tabasco, and Veracruz); and (8) Yucatan Peninsula (Campeche, Yucatan, and Quintana Roo).

The *Pacific North* region has the highest agricultural production. This region includes only 12.8% (2.58 million hectares (ha)) of total land under cultivation in Mexico but 38% (2.12 million ha) of the total irrigated land in Mexico (Table 5) and almost half of the nation's reservoir capacity (Table 6). The majority of Mexican vegetables and melons for export and wheat and soybeans for domestic use are produced in this region (Table 7). Sinaloa, the most important vegetable producing state in

Table 6: Mexico: Water Storage Capacity and Utilization by Irrigation Region, 1984 - 1990^a

Region/District	Total	1984	1985	1986	1987	1988	1989	1990
----- million cubic meters -----								
Northwest	21,332.1	17,791.6	14,125.0	15,630.8	6,805.2	11,501.3	9,877.8	16,931.8
North central	9,255.5	5,692.6	4,201.0	7,026.7	7,066.0	7,152.8	5,083.6	6,993.8
Northeast	8,956.7	5,230.2	5,101.1	5,394.7	6,004.5	6,491.9	3,990.4	4,257.9
Central	5,289.9	3,476.6	3,359.8	3,310.8	2,223.6	2,872.5	2,264.6	3,500.2
South	1,213.5	1,169.1	850.0	536.7	377.8	1,143.0	1,092.8	621.2
Total	46,047.70	33,360.10	27,636.90	31,899.70	22,477.10	29,161.50	22,309.20	32,304.90

^a As of December 31.

Source: INEGIId

Table 7: Mexico: Area Harvested of Principal Basic Crops by Region, 1980/1986

Crop and Year	Pacific North	Pacific Central	Pacific South	North	North Central	Central	Gulf	Peninsula
	----- % -----							
Corn:								
1980	2.5	21.2	19.4	1.9	7.9	29.1	14.7	3.3
1986	2.0	18.6	21.1	4.9	10.1	29.7	10.1	3.5
Dry Beans:								
1980	5.2	13.7	6.8	16.7	35.1	14.6	7.2	0.7
1986	5.4	6.3	6.1	14.3	52.8	11.5	3.4	0.2
Sorghum:								
1980	9.8	24.8	0.6	4.5	1.7	16.9	41.7	0.0
1986	12.9	24.1	0.6	5.1	1.4	22.7	33.0	0.2
Wheat:								
1980	65.0	5.7	2.1	11.8	3.2	11.5	0.7	0.0
1986	64.5	7.4	0.7	7.0	1.4	18.3	0.7	0.0
Soybeans:								
1980	73.7	0.4	3.0	11.9	0.8	0.0	8.8	1.4
1986	71.7	0.0	7.0	5.3	0.7	0.0	15.2	0.1
Barley:								
1980	17.2	2.7	0.2	2.0	11.0	66.8	0.1	0.0
1986	8.4	2.1	0.0	4.1	3.1	81.7	0.6	0.0
Safflower:								
1980	59.9	2.9	0.0	0.8	2.8	0.0	33.6	0.0
1986	24.7	7.4	0.0	1.9	2.1	0.0	63.9	0.0
Rice:								
1980	29.2	13.3	8.1	2.7	0.3	4.4	14.7	27.3
1986	39.1	7.9	4.7	0.0	0.0	3.0	23.9	21.4

Source: INEGI

this region as well as the entire country, accounts for more than 50% of the national production of tomatoes and has important fish resources (Alvarez).

The *Pacific Central* region includes 14% (2.8 million ha) of Mexican land under cultivation and about 12% (0.7 million ha) of the irrigated land in Mexico (Table 5). This region is the major producer of avocados, melons, strawberries, and lemons. The state of Nayarit in this region accounts for 80% of the national tobacco production. The state of Jalisco produces 20% of the sugar cane (Alvarez).

The *Pacific South* and *Yucatan Peninsula* regions include about 17% (3.39 million ha) of total Mexican land under cultivation but less than 4% (0.22 million ha) of the total irrigated land (Table 5). These regions have the most abundant natural resources and abundant rains but are the poorest

regions in the nation. Modern monoculture agriculture is difficult in these regions because of erosion and the presence of insects (Caravias). These regions are known for their production of coffee, rice, tropical fruits, and henequen (Alvarez). The production indexes and living standards of this region are lower than the national averages (Basañez).

Even though the *North* region is mostly arid with very low rainfall, public investment in irrigation and infrastructure in the region has significantly increased cotton, grape, and walnut production. The region comprises about 8% (1.6 million ha) of all cultivated land and 11% of all irrigated land in Mexico (Table 5). About 37% (603,000 ha) of the cultivated land in this region is irrigated. Livestock production is also important in the region and is oriented toward the exportation of feeder cattle to the United States.

The *North Central* region includes about 13% (2.6 million ha) of all cultivated land and 7% (334,000 ha) of all irrigated land in Mexico (Table 5). Although irrigation projects have been limited, this region is the most productive in rainfed dry beans in Mexico (Table 7). The Comarca Lagunera in this region is the most important milk producing area in the nation.

The *Central* region is the most populated and accounts for a significant portion of the national production of corn and dry beans, most of which is produced on small acreage under rainfed conditions. In addition, a large variety of fruit, vegetables, legumes, and cereals are produced in this region. This region includes about 21% (4.3 million ha) of the total cultivated land and about 18% (1.0 million ha) of the total irrigated land in Mexico (Table 5). The majority of Mexican rainfed agriculture is in the Central and Pacific South regions (CESPA-SARH-ONU/CEPAL).

The *Gulf* region, with its extensive pastures, is a major livestock area whose production is mostly aimed at the national market. The region includes about 14% (2.8 million ha) of the total cultivated land and 9% (532,000 ha) of the total irrigated land in Mexico (Table 5). The state of Tamaulipas in this region stands out in sorghum production, accounting for almost 30% of the national output (Table 5).

The Climate and Agricultural Resource Base in Mexico

Mexico is approximately three times the size of Texas and is the third largest Latin American country in land area. Mexico has 31 states and one federal district and a national border of 2,762 miles, of which 2,065 miles of the border are with the United States from the Rio Grande in the Gulf

of Mexico to a point at the northeast of Tijuana in Baja California. Mexico is located in a climatic transition zone, the north and south being split fairly evenly by the Tropic of Cancer. Arid conditions exist in the north and humid tropical and subtropical conditions in the south with moderate to cold climates in the elevated regions. Temperatures remain high and without frosts almost the whole year in the south while in the desert regions of the north, temperatures can be very hot from spring to autumn and then turn very cold in the winter.

Humid tropical climates are found on both coasts (Gulf of Mexico and Pacific Ocean). The greater part of the moderate and cold climates can be found in the central area of the country which includes the Federal District, covering 23.1% of Mexican land area. Low temperatures around freezing can only be found in small areas close to the tops of the higher mountains (Bassols). The dry climates are the most common, however, accounting for 49.1% of the land area. Included are the border states of the North (Tamaulipas, Nuevo Leon, Coahuila, Chihuahua, Sonora, and Baja California Sur) and the North Central states (Aguascalientes, Zacatecas, and San Luis Potosí).

Of the 195.8 million ha of Mexican landmass, only about 24.7 million ha (12.6%) are arable (Table 8). Average area planted over the last decade was only 21.3 million ha. Another 74.5 million ha (38.0%) are considered permanent pasture not currently suitable for cultivation. According to one report, about 7.4 million ha of Mexican pasture land has potential for crop production but massive investment in infrastructure would be required to bring that area into production (PEF). The amount of land considered arable varies each year depending on precipitation and the availability of water for irrigation. Forests and jungles amount to 60.1 million ha (30.7% of the land area) and include some area considered to be permanent pasture. Bushland and arid zones make up a total of 66.2 million ha (33.8% of the land area) and also provide varying degrees of forage value for livestock grazing (CESPA-SARH-ONU/CEPAL).

Of the land area dedicated to crop production in Mexico in 1987, only 5.1 million ha (20.6%) are irrigated. The remainder is rainfed land but only about 14% is considered to be good rainfed land. As a result, the availability of irrigation is one of the most limiting factors for increased crop production and yields in Mexico. Yields are significantly higher for most crops on irrigated land than on rainfed land. Per hectare yields of corn, wheat, and tomatoes, for example, are 2 to 3 times higher on irrigated land than on non-irrigated land in Mexico (Table 9). The majority of Mexican wheat, soybeans, and horticultural crops are grown on irrigated land (Table 9). However, only 12% of Mexican corn and 8% of Mexican beans, the two most important staple crops in Mexico, are produced on irrigated land (Table 9).

Table 8: U.S.-Mexico: Factors of Agricultural Production, 1970 - 1988

Year	Arable & Perm. Cropland ^a		Permanent Pastures		Irrigated area		Ag. workers/ 1,000 ha		Tractors/ 1,000 ha		Tractors/ 1,000 workers		Fertilizer use	
	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico	U.S.	Mexico
	--- 1,000 ha ---		--- 1,000 ha ---		--- 1,000 ha ---								--- kg/ha ---	
1970	190,500	23,138	243,900	74,499	16,000	3,583	20	284	28	4	1,410	14	82	23
1975	188,218	23,840	241,940	74,499	16,690	4,479	20	312	27	4	1,354	13	101	45
1980	190,624	24,530	237,539	74,499	20,582	4,980	20	340	25	5	1,243	14	113	51
1985	189,915	24,700	241,467	74,499	18,102	5,285	18	359	25	6	1,400	18	94	69
1987	189,915	24,705	241,467	74,499	18,102	5,084	17	367	25	7	1,486	18	93	75
1988	189,915	24,710	241,467	74,499										

^a U.S. total landmass = 937,261,000 ha and Mexico total landmass = 195,820,000 ha.

Source: USDAa

Table 9: Mexico: Irrigated and Rainfed Area and Yields for Selected Crops, 1985

Crop	Irrigated Land		Rainfed Land		Total Land		Irrigated Share
	Area	Yield	Area	Yield	Area	Yield	
	ha	mt/ha	ha	mt/ha	ha	mt/ha	%
Annual Crops:							
Corn	1,006,515	3.36	7,359,442	1.64	8,365,957	1.86	12
Dry Beans	151,382	1.26	1,928,320	0.45	2,079,702	0.51	8
Wheat	1,075,969	4.73	197,562	1.46	1,273,531	4.28	84
Sorghum	603,541	4.43	1,456,594	3.14	2,060,135	3.54	29
Soybeans	429,731	2.05	75,106	1.28	504,837	1.95	85
Cotton	200,495	3.12	7,634	1.66	208,129	3.07	96
Tomatoes	62,189	24.97	11,689	14.32	73,878	23.32	84
Cucumbers	15,177	16.63	217	7.41	15,394	16.47	99
Onions	29,141	19.00	8,056	13.53	37,197	17.76	78
Broccoli	4,307	11.20	0	0.00	4,307	11.20	100
Cauliflower	2,208	11.89	46	5.00	2,254	11.74	98
Cantaloupe	25,228	14.00	8,572	9.74	33,800	12.73	75
Watermelon	17,264	13.79	223,234	10.91	240,498	12.18	43
Others	863,295		1,400,429		2,263,724		38
Total annual	4,486,442		12,676,901		17,163,343		26
Perennial Crops:							
Limes	51,229	11.89	25,416	13.7	76,645	12.39	67
Oranges	47,210	10.17	134,012	15.05	181,222	13.87	26
Apples	41,107	9.85	25,038	5.48	66,145	8.10	62
Grapes	69,390	9.72	1,151	1.55	70,541	9.61	98
Bananas	33,196	31.59	51,945	21.24	85,141	25.23	39
Alfalfa	248,681	56.73	2,825	55.21	251,506	56.72	99
Improved Pasture	79,692	48.87	139,963	16.25	219,655	27.67	36
Others	583,974		1,474,170		2,058,144		28
Total Perennial	1,154,479		1,854,520		3,008,999		38
Total Annual & Perennial	5,640,921		14,531,421		5,640,922		28

Source: SARHd

The scarcity of irrigation water in many areas of Mexico is not a lack of irrigation infrastructure necessarily but rather a lack of adequate precipitation for full utilization of the existing infrastructure. The total water storage capacity for irrigation in Mexico is about 46 billion cubic meters. From 1984 to 1990, however, the utilization of existing capacity fluctuated from a high of 33.4 billion cubic meters in 1984 to a low of 22.3 billion cubic meters in 1989 (Table 6). Also, public investment in new irrigation projects declined precipitously in real terms from 9.3 billion pesos in 1984 to 2.2 billion pesos in 1988 (Table 10). The state of Sinaloa was the largest recipient of investment in irrigation projects during this period with an accumulated 7.3 billion pesos from 1984 to 1988. Sinaloa also leads Mexico in total number of irrigated hectares.

The lack of adequate irrigation in most agricultural areas of Mexico means that crop production in Mexico depends to a large degree on climatic conditions. Rains are concentrated in two periods in Mexico, the most important of which is July to October and the other is December to January (SARHb). With the exception of the coasts and the high mountains, there is little or no rain the rest of the year. The Pacific South and Yucatan regions of the country have the highest rainfall ranging from 40 inches to 80 inches annually. Large expanses of the North, North Central and Central areas of Mexico suffer from extremely dry conditions. Average annual rainfall for the states in these regions range from 5.7 inches in Baja California to 26.1 inches in San Luis Potosí.

Rainfed farming yields in the northern regions are quite low. The minimum average annual rainfall necessary for an acceptable level of productivity from rainfed farming in Mexico is 31 inches, so that it is nearly impossible to obtain a harvest without irrigation in these low rainfall areas (Bassols). Only eight states in the Gulf, Peninsula, Pacific South, and Central regions receive an annual rainfall of more than 31 inches while most states in the Pacific North, North, and North Central regions as well as the state of Tamaulipas in the Gulf region receive considerably less. Most states in the North Central, Pacific Central, and Central regions occupy an intermediate position with average annual rainfall ranging between 24 and 40 inches (SARHb).

The distribution of water resources for irrigation in Mexico is not uniform. In some regions there are rivers with abundant water (e.g., Tabasco, Veracruz, southern Sonora, Sinaloa, the coasts of Oaxaca, Nayarit, and Chiapas). In other regions, there are few if any rivers (e.g., Baja California, the northeast part of the country, and the major part of the Yucatan Peninsula). Most rivers in Mexico are not long nor do they have large volumes of water. There are about 100 rivers that empty into the Pacific Ocean including the Balsas and the Lerma-Santiago rivers, the two largest. Forty six rivers empty into the Gulf of Mexico, the largest of which includes the Usumacinta, the Papaloapan,

Table 10: Mexico: Public Investment in Irrigation Projects by State, 1984 - 1988

State	1984	1985	1986	1987	1988	1984-88
	----- million 1980 pesos -----					
Aguascalientes	0.0	19.3	8.2	8.2	2.4	38.1
B. California N.	270.6	180.9	137.6	109.2	15.3	713.6
B. California S.	160.0	344.6	212.2	70.4	16.1	803.4
Campeche	67.9	12.8	56.5	59.4	15.9	212.5
Coahuila	172.0	155.8	122.0	108.6	16.5	574.9
Colima	213.1	110.8	129.2	229.2	196.6	879.0
Chiapas	345.8	388.1	188.8	140.1	67.0	1,129.8
Chihuahua	496.2	470.3	370.0	144.4	111.9	1,592.9
Durango	70.0	238.3	419.4	2,267.1	127.3	3,122.2
Guanajuato	218.5	79.6	182.9	103.9	27.6	612.5
Guerrero	937.6	725.2	504.4	299.0	74.5	2,540.7
Hidalgo	418.5	217.5	221.8	112.3	25.1	995.2
Jalisco	181.1	197.0	148.7	330.2	167.9	1,025.0
México	271.9	197.0	148.0	111.5	24.8	753.2
Michoacán	930.9	799.9	599.8	336.3	438.4	3,105.2
Morelos	0.0	176.4	159.0	158.6	75.8	569.8
Nayarit	123.5	121.8	101.5	87.3	26.8	460.8
Nuevo León	22.8	129.4	57.4	38.3	9.4	257.3
Oaxaca	116.4	234.1	559.1	70.3	72.8	1,052.8
Puebla	0.0	43.9	36.6	33.1	30.1	143.7
Querétaro	2.4	88.9	54.9	20.5	7.8	174.4
Quintana Roo	0.0	39.4	43.5	16.2	5.4	104.4
Sinaloa	2,875.6	1,942.3	1,226.6	846.9	387.9	7,279.2
Sonora	48.8	252.6	156.5	81.4	19.0	558.2
Tabasco	28.3	57.1	54.6	24.1	6.4	170.5
Tamaulipas	787.6	693.6	605.1	333.1	131.9	2,551.3
Tlaxcala	229.8	64.4	90.0	22.2	5.1	411.7
Veracruz	239.8	200.3	77.2	63.1	26.0	606.3
Yucatán	0.0	53.7	43.4	27.9	9.4	134.3
Zacatecas	65.7	171.8	46.9	71.2	50.3	405.8
Total	9,295.0	8,406.9	6,761.8	6,324.3	2,191.5	32,979.5
Percent change from previous year		-10	-20	-16	-65	

Sources: INEGId, NFb

the Grijalva, the Coatzacoalcas, and the Panuco. The majority of these rivers is located in southern Mexico (Salazar).

Mexican lakes and lagoons hold approximately 494.4 billion cubic feet of water and are used for agriculture, generation of electricity, recreation, and fish production. The water capacity of the reservoirs is around 4,403.7 billion cubic feet (INEGI). Over exploitation of the underground aquifers is a big problem in some of the North Central and Northeast regions of the country. The Secretaría de Agricultura y Recursos Hidráulicos or SARH (the Mexican Ministry of Agriculture and Water Resources) has established methods to control this problem through techniques such as designating areas in which harvesting of underground water is prohibited, restriction of water drilling permits, etc. Nevertheless, they have not been able to deter the depletion of the aquifers (Salazar).

The Mexican Land Tenure System

Land tenure in Mexico has been characterized by a unique mixture of private property and socialism. Land tenure was one of the driving forces behind the Mexican revolution of 1910-17. In fact, "land and liberty" was one of the most popular battle cries of the revolution. The *ejido* system of land tenure in Mexico was instituted in the 1930s, largely as the result of pressures for land reform stemming from the revolution. Today, the term *ejido* refers to land that the government of Mexico grants a group of people in accordance with the nature and requirements of the "Agriculture Code." Most *ejidos* have three basic types of land divisions: (1) individual family land parcels, (2) land area held in common by all the families on an *ejido*, and (3) the community land portion of the *ejido* on which the houses, schools, etc. are located.

An *ejidatario* (the head of an *ejido* family) has had limited rights with respect to his parcel of land. Although *ejido* land could be transferred or bequeathed to an heir who was economically dependent on the *ejidatario*, the land could not be legally sold, rented, or mortgaged, although those practices have apparently been common (Flores; Mielke 1990). On most *ejidos*, the *ejidatarios* work their family land parcels independently. On some *ejidos*, however, the *ejidatarios* pool their land and other resources and work collectively (Flores).

Total *ejido* land area in Mexico was 95.1 million ha in 1988, approximately 50% of the total land area of the whole country. *Ejido* cropland accounted for 20.3 million ha (21.4% of total *ejido* land). Woods and forests accounted for 16.5 million ha (17.3%) followed by natural pastures and rangelands accounting for 54.2 million ha (57%) and other uses accounting for 4.1 million ha (4.3%)

(Figure 4). Of the *ejido* cropland, 16.9 million ha were rainfed and 3.4 million ha were irrigated in 1988.

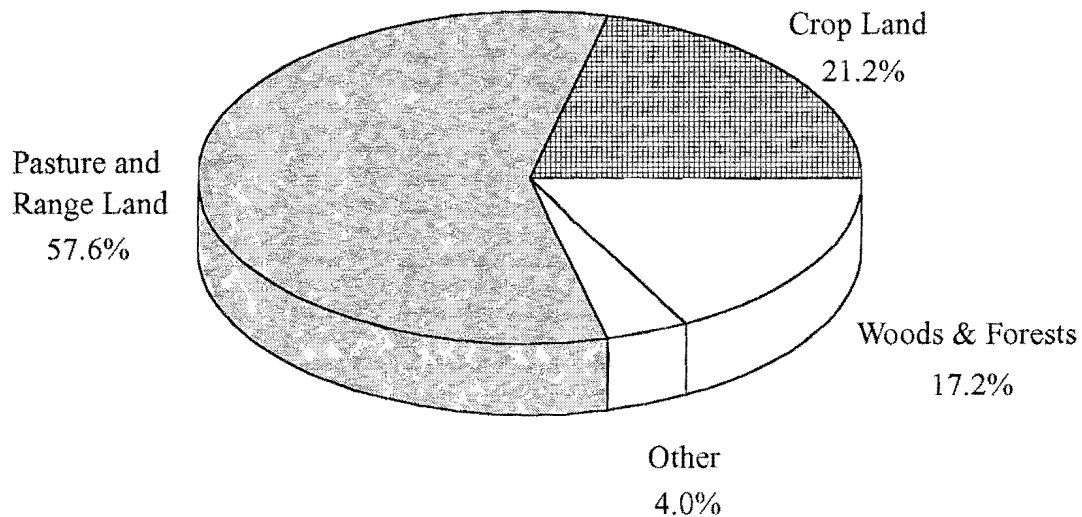
With a total of 3.07 million *ejidatarios*, the national average irrigated and rainfed land area per *ejidatario* in 1988 was 1.1 ha and 5.5 ha, respectively. Crop production was the principal activity for 84.4% of the total 28,058 *ejidos* followed by livestock production (21%), forestry (1.7%), and other (1.8%). The majority of the *ejido* land was worked on an individual basis (22,699 *ejidos* or 80.9%) and the remainder (5,359 *ejidos* or 19.1%) in a collective or semi-collective system in 1988 (NFa).

Communal land, in contrast to *ejido* land, is owned by indigenous groups and is usually worked collectively. *Comunales*, or farms on communal land, were created around the same time that the *ejido* system was established. The creation of *comunales* was an attempt to give land back to indigenous groups who had their land taken away by the *hacendados*, the rich owners of large haciendas in the early 1900s.

Private property or *pequeña propiedad* (small, privately owned land) includes agricultural land owned by individuals rather than either being owned by the government or being included as part of the *ejido* system or the *comunales*. About 8% of the private property is farmed or managed by renters, sharecroppers, squatters, *colonos*, and others. The remainder is owned and managed by private individuals. *Colonos* are individuals that were resettled on federally-owned land under government sponsorship and given the option to buy the land (USDAh). After fulfilling all payment obligations, *colonos* are given title to the lands they occupy and become *pequeño propietarios* or small property holders. By law, privately owned land cannot exceed the designated size limits which are related to the type of land and its use. Owners of private property are allowed to sell their land if they so choose. Total communal land area was about 10 million ha in 1987 with private property land holdings at 69 million ha (SARHa; Hall and Livas-Hernandez).

Although popular in Mexico, especially among the rural poor, the *ejido* system has been blamed for the poor performance of the Mexican agricultural sector to a large extent. Many experts have concluded that the *ejido* system has been one of the biggest constraints on Mexican agriculture. As a consequence, Mexican President Salinas de Gortari, with the support of many important government officials, recently pushed historic land reform legislation through the Mexican Congress to help eliminate inefficiencies and promote growth in the Mexican agricultural sector. Under the new land reform laws, Mexican *ejidatarios* will essentially be allowed to sell or rent their land with

Figure 4: Mexico: Ejido Land by Type, 1988



Source: NFA

some restrictions. The new law will also allow limited foreign ownership of Mexican land. The implications of these new laws for Mexican agriculture are discussed in a later section.

U.S.-Mexico Agricultural Commodity Trade Flows and Trends

Mexico is now the third largest foreign importer of U.S. agricultural products behind Japan and Canada and the second largest foreign supplier of agricultural products to the U.S. behind Canada. U.S. agricultural exports to Mexico have increased from \$600 million in 1975 to over \$2.8 billion in 1991. U.S. agricultural imports from Mexico have experienced similar growth, expanding four-fold to \$2.5 billion during the same period. The United States, however, is far more important to Mexico as an agricultural trading partner, both as a supplier and a purchaser, than is Mexico to the United States. Mexico purchased just 6% of total U.S. agricultural exports in 1989. On the other hand, the U.S. purchased 79% of all Mexican agricultural exports in that year.

Major Agricultural Commodities Traded With Mexico

Although meat and meat products were the largest U.S. agricultural export to Mexico in 1990 (in U.S. dollar value), Mexico accounted for only 8.5% of the total \$2.5 billion in U.S. meat and meat product exports in that year (Figure 5). The story is much the same for most of the other major U.S. agricultural commodities exported to Mexico. Mexico accounted for only 16.7% of the total \$576 million of U.S. seed exports in 1990, 21.6% of the \$361 million of live U.S. animal exports, and 21.6% of the \$349 million of U.S. dairy product exports. Sorghum is the major U.S. commodity for which Mexico is the dominant export market. Mexico took 42.7% of the \$811 million of U.S. sorghum exports in 1990.

On the import side, Mexico is also only one of many foreign suppliers of U.S. agricultural commodity imports. Even for horticultural products, the largest U.S. agricultural import from Mexico, only slightly over a third (35.8%) of the \$3.5 billion in imports came from Mexico in 1990 (Figure 6). At the same time, only 19.8% of the \$2.0 billion in U.S. coffee imports came from Mexico, 35.8% of the \$1.0 billion in U.S. live animal imports, and 9.8% of the \$1.0 billion in U.S. fruit juice imports.

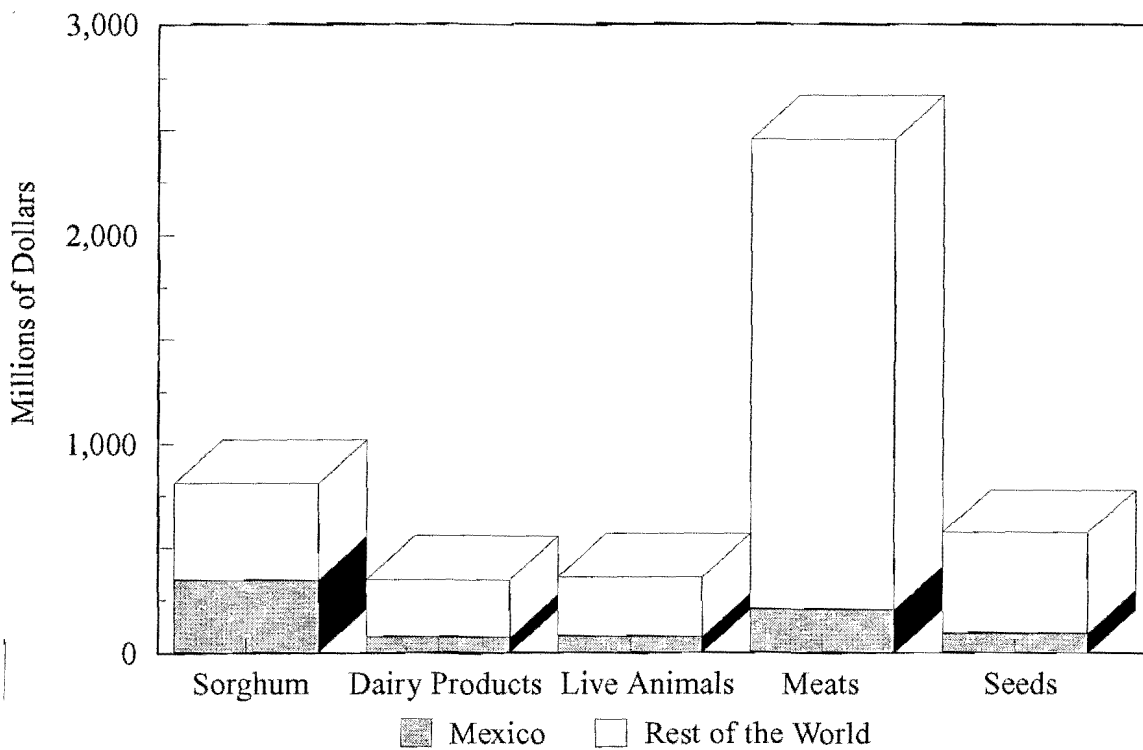
In contrast, the U.S. accounts for the largest share of major Mexican agricultural exports, (Figure 7). About 95% of the \$820 million in Mexican horticultural product exports went to the U.S. in 1990, 75.3% of the \$585 million of Mexican coffee exports, 50% of the \$392 million of Mexican live animal exports (mostly feeder cattle), 98.2% of the \$275 million of Mexican malted beverage (beer) exports, and 55.9% of the \$143 million of Mexican sugar exports.

Likewise, the U.S. accounts for a dominant share of the major agricultural commodities imported by Mexico (Figure 8). The U.S. supplied 95% of the \$397 million of grains imported by Mexico in 1990, 79.8% of the \$351 million in Mexican oilseed imports, 43.8% of the \$171 million in Mexican dairy product imports, 91.7% of the \$109 million of Mexican vegetable oil imports, and 81.4% of the \$473 million of the "other" agricultural products imported by Mexico in 1990.

U.S.-Mexico Livestock and Livestock Products Trade

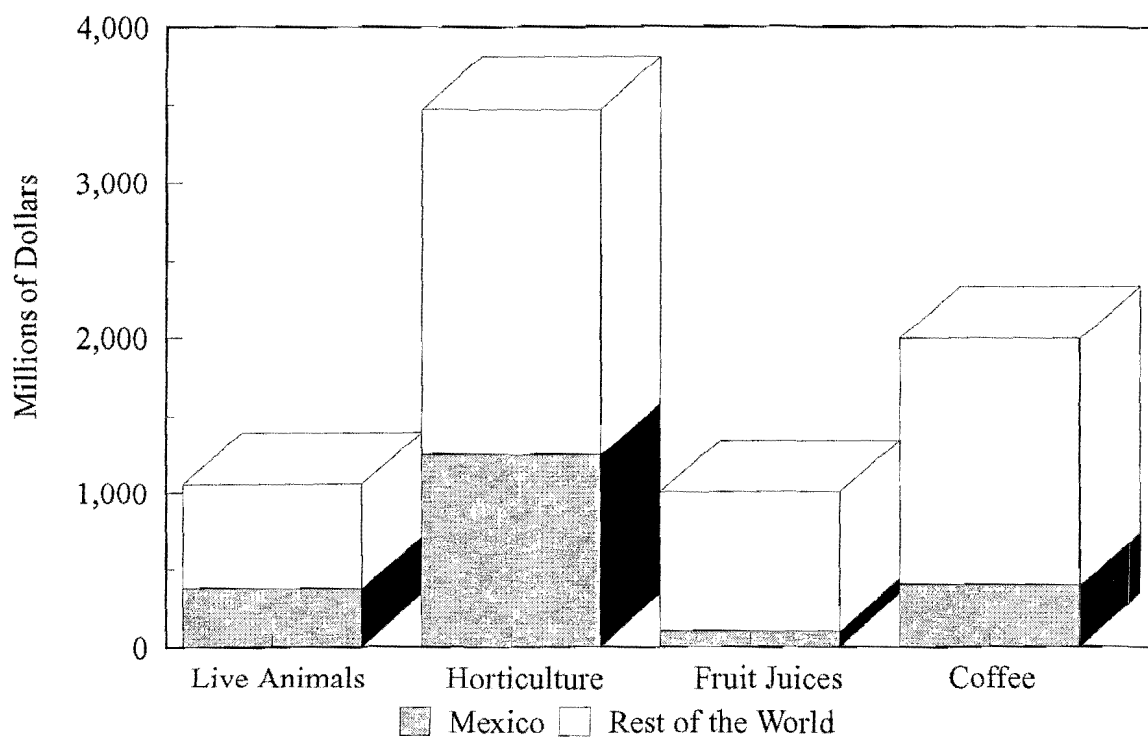
U.S. livestock and product exports to Mexico more than doubled over the last decade to \$643 million in 1990 (Table 11). In the last half of the 1980s, livestock products accounted for 85% of the

Figure 5: U.S.: Major Agricultural Commodities Exported to Mexico, 1990

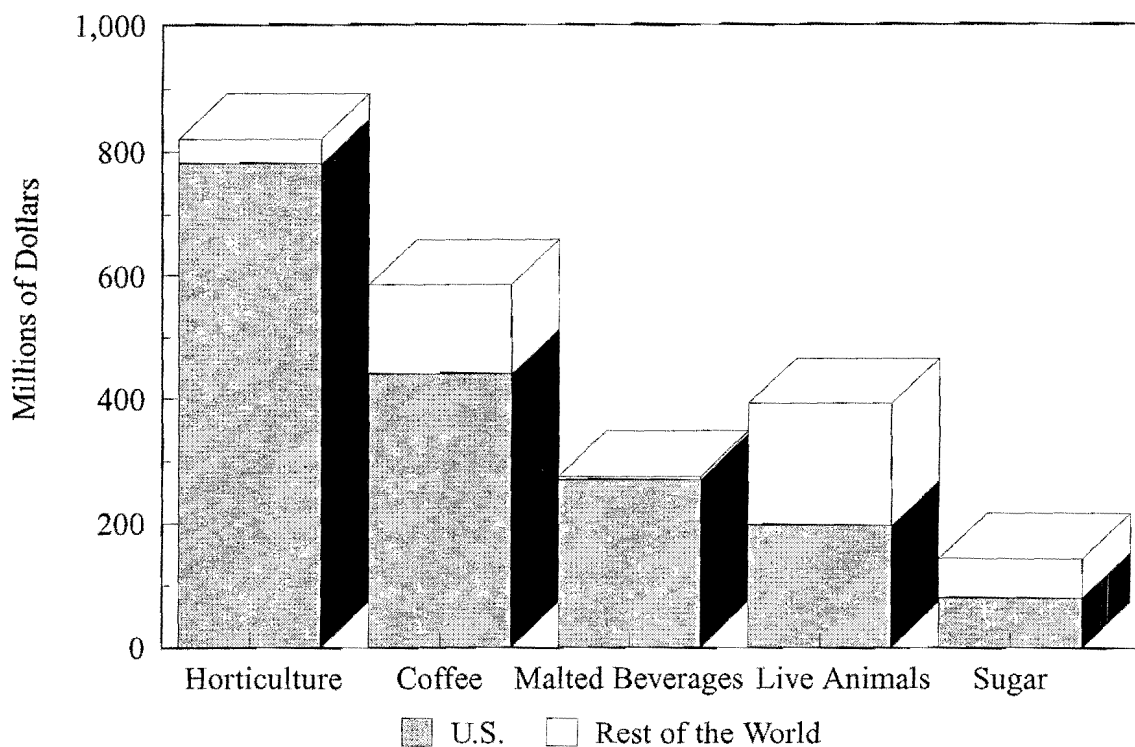


Source: USDAb

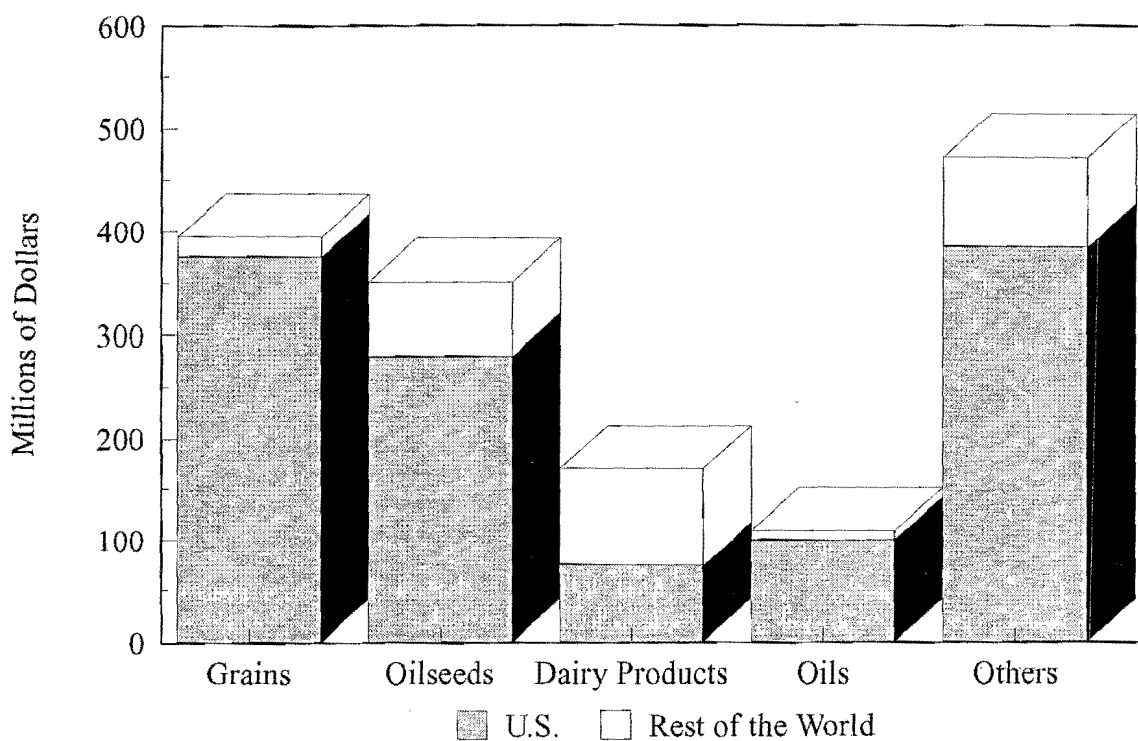
Figure 6: U.S.: Major Agricultural Commodities Imported from Mexico, 1990



Source: USDAb

Figure 7: Mexico: Major Agricultural Exports, 1990

Source: USDAb, USDAc

Figure 8: Mexico: Major Agricultural Imports, 1990

Source: USDAb, USDAc

Table 11: U.S.: Livestock and Meat Exports to Mexico, 1980-1990

Year	Cattle	Hogs	Sheep	Beef & Veal	Pork	Chicken
	----- head -----		----- mt -----			
1980	15,000	2,983	85,906	887	8,631	12,976
1981	25,000	8,036	143,760	1,315	11,054	15,278
1982	24,016	14,530	0	1,348	11,977	19,181
1983	5,103	2,501	0	246	8,784	5,130
1984	22,921	1,371	0	187	10,385	7,449
1985	89,205	4,160	0	1,670	11,842	13,320
1986	67,600	3,123	0	238	1,302	15,456
1987	49,465	1,090	0	1,432	614	14,089
1988	174,657	27,493	81,312	13,601	9,786	30,202
1989	202,466	157,869	274,216	28,586	23,166	56,457
1990	64,635	42,525	395,375	26,426	14,978	38,725

Sources: Rosson, Schulthies, and White; USDAb

total, increasing from \$286 million in 1980 to a peak of \$813 million in 1989. U.S. live animal exports to Mexico increased four-fold over the period, peaking at \$163 million in 1989 but still representing only 10.0% of the total value of U.S. livestock and product exports to Mexico in 1990. Live animal exports to Mexico accounted for almost one-fifth of all U.S. live animal exports while livestock product exports to Mexico represented only 9% of the total.

Cattle are the most important category of live animals shipped to Mexico (\$53.8 million in 1990) and are composed primarily of slaughter cattle and dairy and beef breeding cattle (Figure 9). During the 1980s, U.S. cattle exports to Mexico increased from 15,000 head (hd) to 202,466 hd in 1989 (Table 12). Nevertheless, cattle shipments from Mexico have been highly variable with annual fluctuations of over 20,000 hd at times. Most of the variability has resulted from erratic imposition of quotas or licensing requirements by the Mexican government to protect the domestic market and prices. U.S. beef exports to Mexico have also exhibited erratic behavior (Table 12). Most U.S. beef going to Mexico is high-quality, grain-fed beef and destined for Mexico City and key tourist areas throughout the country.

Other U.S. live animal exports to Mexico in 1990 included sheep (\$11.4 million), baby chicks (\$6.0 million), hogs (\$5.5 million), and horses (\$3.8 million). U.S. live hog exports to Mexico during

Table 12: U.S. and Mexico: Bilateral Trade in Livestock and Livestock Products, 1980 and 1985-90^a

U.S. Exports to Mexico				U.S. Imports from Mexico			U.S. Trade Balance ^b
Year	Livestock	Livestock Products	Total Exports	Livestock	Livestock Products	Total Imports	
----- million \$US -----							
1980	23.4	258.5	281.9	137.3	7.9	145.2	136.7
1985	96.6	365.7	462.3	56.8	15.8	72.6	389.7
1986	81.9	278.4	360.3	227.3	23.6	250.9	109.4
1987	36.7	278.7	315.4	312.4	23.2	335.6	-20.2
1988	121.3	499.5	620.8	314.1	20.1	334.2	286.6
1989	162.5	812.8	975.3	198.8	25.9	224.7	751.1
1990	85.2	557.5	642.7	376.8	42.6	419.4	217.7

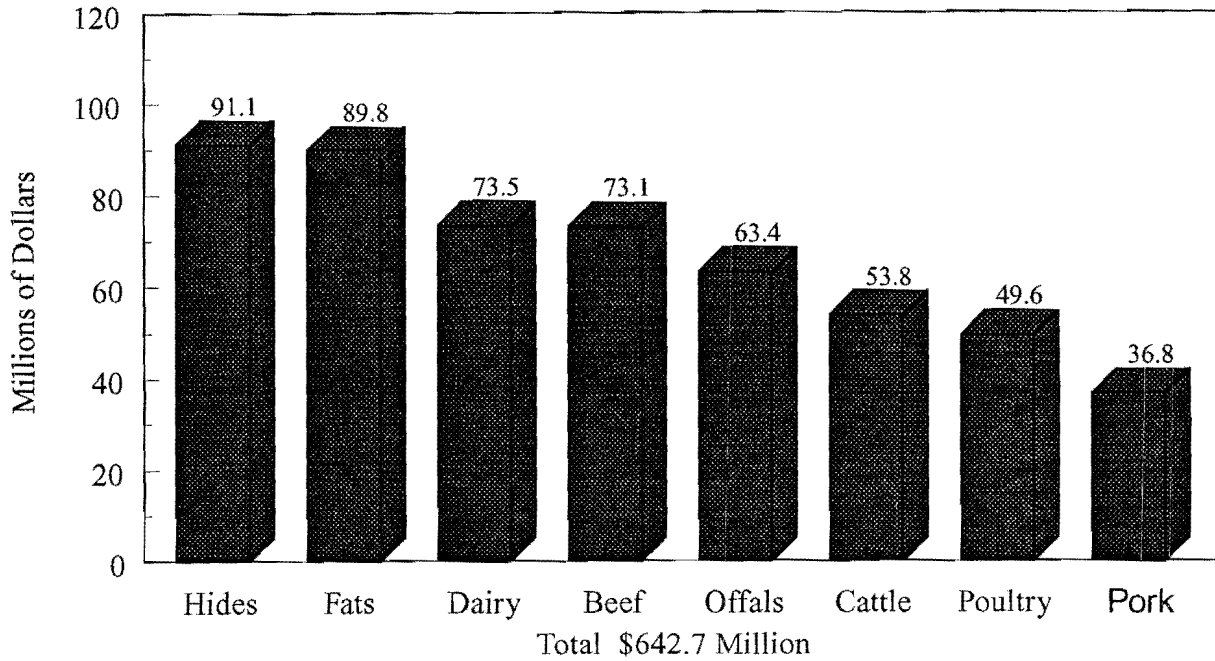
^a Livestock includes cattle, hogs, sheep, goats, poultry, horses, asses, and other.

^b Trade balance is exports-imports.

Source: USDAb

the 1980s were just as erratic as live cattle exports. For example, hog exports jumped by nearly 500% in one year from 27,493 hd in 1988 to 157,869 hd in 1989 and then dropped by nearly 75% the next year to 42,525 hd (Table 11). U.S. pork exports to Mexico have exhibited similar trends as the Mexican Government has intervened frequently from year to year to protect the growing domestic pork industry and aid the ailing domestic beef industry. U.S. sheep exports to Mexico have also been extremely variable but have increased rapidly over the last few years from virtually nothing in 1987 to nearly 400,000 had in 1990. U.S. chicken exports to Mexico are almost entirely broilers and have exhibited relatively steady growth since at least the mid-1980s.

Hides and skins exports to Mexico were the top U.S. livestock product exported to Mexico in 1990 (\$91.1 million) (Figure 9). Almost two-thirds of those exports were cattle hides valued at \$60 million. Other important U.S. livestock product exports to Mexico in 1990 included fats, oils, and greases (\$89.8 million), dairy products (\$73.5 million), beef and veal (\$73.1 million), and edible offals (\$63.4 million). Mexico was the largest U.S. export market for all these products in 1989 except beef and veal. Mexican dairy imports from the U.S. exceeded \$228 million in 1989, making Mexico the largest importer of U.S. dairy products that year, much of which was non-fat dry milk. Mexican dairy imports from the U.S., however, dropped by two-thirds to \$73.5 million in 1990. Mexico is the

Figure 9: U.S. Livestock and Product Exports to Mexico, FY 1990

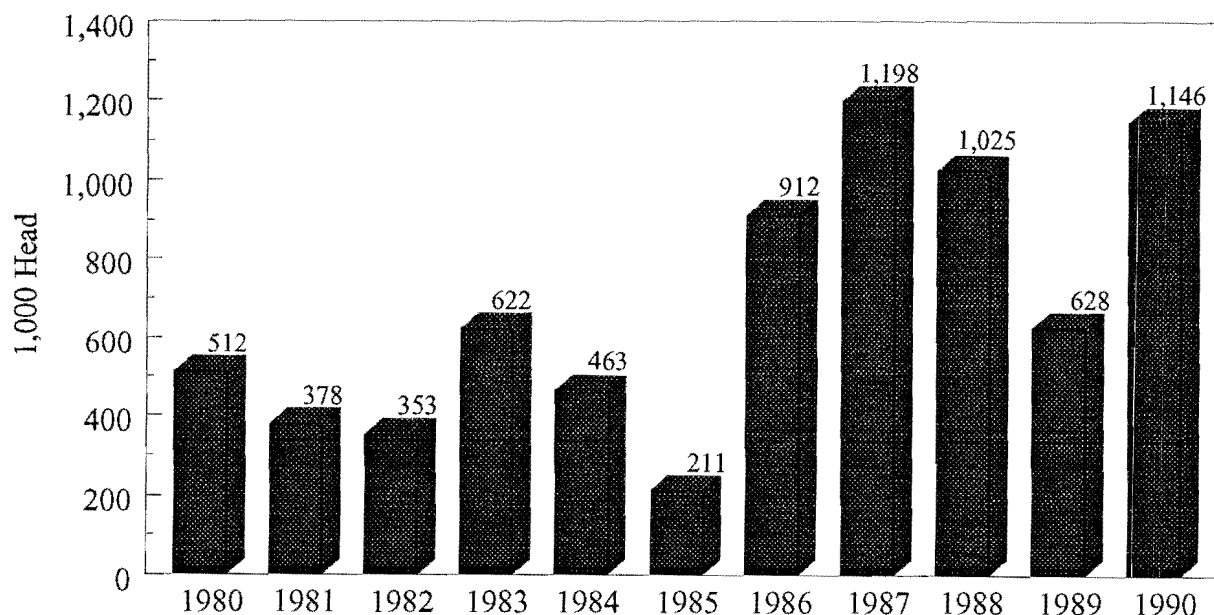
Source: USDAb

fourth largest U.S. beef export market after Japan, Canada, and South Korea. U.S. poultry and pork exports to Mexico were valued at \$49.6 million and \$36.8 million, respectively, in 1990.

The U.S. also imports livestock and livestock products from Mexico. These imports are growing and are dominated by live animals. Although accounting for 7.6% of total U.S. livestock and product imports, Mexico accounts for 35% of total U.S. live animal imports. Of the \$419 million in U.S. livestock and product imports from Mexico in 1990, live animal imports were the most important at a value of \$376 million. Total cattle imports from Mexico increased from 512,000 hd in 1980 to a peak of 1.2 million hd in 1987, declined to 628,000 hd in 1989, and then jumped back to 1.15 million hd in 1990 (Figure 10).

Feeder cattle have historically accounted for about 90% of U.S. cattle imports from Mexico. Mexican feeder cattle are an important source of low cost input for the U.S. cattle feeding industry but are also a source of import competition for U.S. cow-calf producers. Substantial growth in Mexican feeder cattle imports has occurred since 1980. About 95% of total U.S. feeder cattle imports

Figure 10: U.S. Cattle Imports from Mexico, FY 1980 - 1990



Source: USDAb

come from Mexico with Canada supplying the remainder. Most feeders from Mexico are of comparable quality to U.S. feeders although some poor quality Mexican cattle apparently gain access to the U.S. market. Feeders from Mexico represent only about 3.0% of total U.S. cattle slaughter but one-third of the cattle on feed in the Texas Panhandle (Rosson, Schulthies, and White).

Imports of feeder cattle are relatively duty free. Until recently, Mexico imposed a \$60/hd export tax on Mexican feeder cattle exports (Rosson, et.al.). In early 1990, however, Mexico reduced the tax to \$30/hd and then later to \$15/hd. For the 1991/92 marketing year, the tax is set at \$5/hd and will reportedly be eliminated for the 1992/93 marketing year. The U.S. assesses feeder cattle a 1.5% *ad valorem* import duty upon entry into this country. The Mexican export tax restricts the flow of feeder cattle to the U.S. to some extent as part of the Mexican government's effort to hold down the cost of fat cattle for slaughter and to maintain adequate beef supplies in Mexico City.

U.S. imports of livestock products from Mexico account for only 1% of total U.S. livestock product imports and comprise less than 10% of total U.S. livestock and product imports from Mexico. Major livestock products imported from Mexico in 1990 included dairy products (\$13.4 million), hides and skins (\$11.9 million), and sausage casings (\$11.7 million). Sheep and lamb skins accounted for about 50% of total hides with cattle making up the remainder.

U.S.-Mexico Trade in Other Commodities

Other major agricultural commodities traded between by the U.S. and Mexico include grains, fruits and vegetables, cotton, and dairy products. Sugar, coffee, malt beverages, and other commodities are increasingly important components of U.S.-Mexico agricultural trade.

U.S.-Mexico Grain Trade

Mexico began importing more grains to satisfy a growing demand in the early 1970s and has become an increasingly important export market for U.S. feedgrains and wheat. From 1987 to 1989, Mexico ranked number three behind only Japan and Russia as a market for U.S. feedgrain exports with a 7.5% market share, or about 2% to 3% of total U.S. feedgrain production (USDAb). Although Mexico was a net exporter of coarse grains and wheat during the 1960s, consumption began to outpace production of wheat, corn, and other coarse grains in the early 1970s. As a result, though still interested in obtaining self-sufficiency in food production, Mexico was forced to import coarse grains and wheat to satisfy the needs of its growing population. While imports trended higher into the late 1970s for both coarse grains and wheat, the levels of imports were erratic and highly dependent on weather variability and changes in government policies.

The culmination of the debt crisis in the early 1980s led to a significant jump followed by a sharp, but relatively short-lived, drop in Mexican imports of grains from both the U.S. and the rest of the world. Mexican grain imports began an upward trend again during the late 1980s (Figures 11 and 12). The U.S. share of Mexican coarse grain imports has varied widely over time from 43% in 1972 to nearly 100% in other years. Over the same time period, U.S. wheat has accounted for as much as 100% and as little as 0% of total Mexican wheat imports. By virtue of their close proximity and on the basis of transportation costs alone, the U.S. has captured a large portion of the Mexican import business in wheat, coarse grains, and other major agricultural commodities.

Figure 11: Mexico: Supply and Demand for Corn, 1981 - 1990

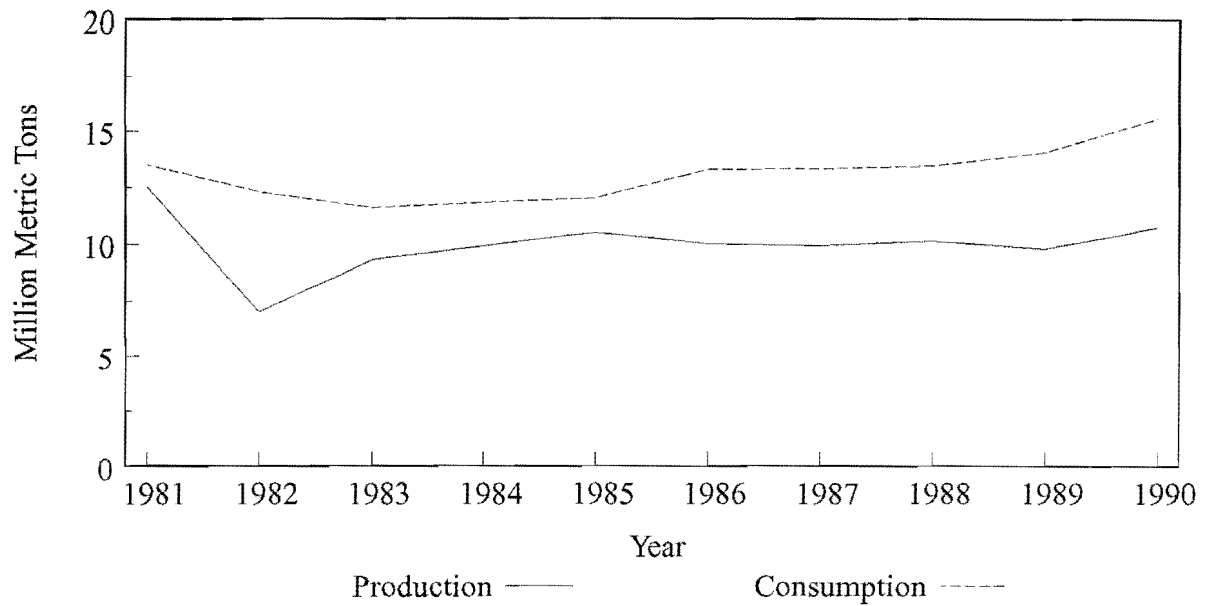
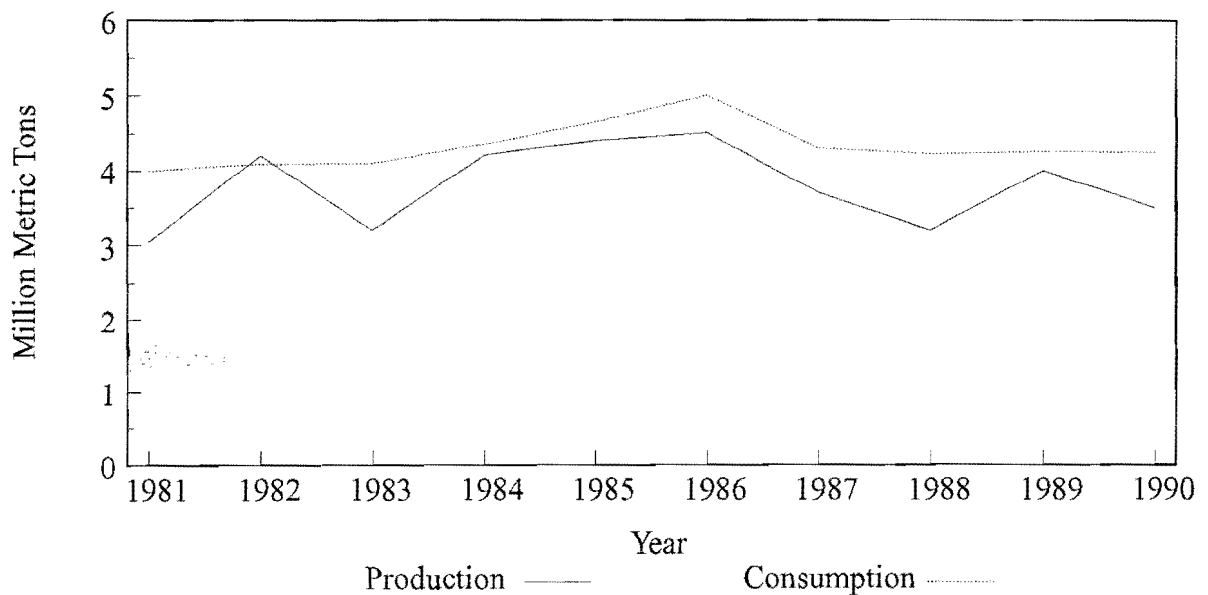


Figure 12: Mexico: Supply and Demand for Wheat, 1981 - 1990



Fruits and Vegetables

Mexico is a net exporter of vegetables, fruits, and nuts. Mexican exports of these commodities doubled during the 1970s from \$155.4 million to \$361.0 million and increased to about \$500.0 million by the late 1980s. Horticultural products comprise about one-third of the total value of all Mexican agricultural exports. The U.S. imports about 90% of those exports, underscoring the importance of the U.S. market not only to Mexican horticultural producers but also the entire Mexican agricultural sector. Between 1985 and 1989, U.S. imports of Mexican fruits, melons, and vegetables averaged nearly \$667 million annually (Table 13). U.S. consumption of fresh fruits and vegetables has grown steadily since the mid 1970s. U.S. per capita consumption of non-citrus fruit increased 20-25% over that period while consumption of fresh vegetables increased by at least 15-20% (Brown and Suarez). Much of the increased demand is met by imports with Mexico the leading foreign supplier.

There is limited recent data on Mexican foreign trade in specific fresh vegetables and melons. Mexico annually exported about 260,000 metric tons (mt) of fresh tomatoes from 1981 to 1985, about 25% of total Mexican production (Hall and Livas-Hernandez). Over the same period, Mexico exported about 18,000 mt of green chilies annually, about 3.5% of production. Annual watermelon exports averaged about 83,000 mt in 1978-1982, about 19% of Mexican production and 105,000 mt of cantaloupe, about one-third of annual Mexican production (Hall and Livas-Hernandez).

Tomatoes comprised 38% of the value of all fresh vegetables imported by the United States from Mexico in 1989. The value of U.S. cucumber imports from Mexico accounted for 15% of the value of all Mexican vegetable imports in 1989. The same was the case for peppers and chilies. U.S. onion imports from Mexico reached \$58 million in 1989 and accounted for 10% of the value of all fresh vegetable imports from Mexico. The value of U.S. squash imports from Mexico hit \$35.5 million (6.1% of the value of all vegetable imports from Mexico) in 1989. Asparagus, broccoli, cauliflower, and okra together accounted for 4% of the total value of U.S. fresh vegetable imports from Mexico (*Horticultural Products Review*).

Historically, U.S. fresh vegetable and melon imports from Mexico were in the winter-spring period. Since the early 1980s, however, imports from Mexico have increasingly occurred year-around. Mexican cucumbers command over 40% of the U.S. cucumber market (Table 14). Mexican bell peppers, cantaloupe, honeydew melons, and watermelons account for 15% to over 25% of their respective U.S. markets.

Table 13: U.S. and Mexico: Bilateral Trade in Selected Vegetable Commodities, 1985-1989 Average

Item	U.S. Exports to Mexico		Mexican Exports to U.S.	
	Quantity	Value	Quantity	Value
	mt	\$US	mt	\$US
Cantaloupes	114	33,664	112,000	34,066,000
Watermelon	102	12,577	116,800	17,070,000
Cucumber	47	18,000	186,000	64,895,000
Onions	2,626	669,000	126,000	50,674,000
Peppers	186	68,000	104,000	62,096,000
Broccoli	128	71,605	9,000	2,261,000
Total Melons	288	61,386	266,902	61,934,581
Total Vegetables	10,181	4,514,540	1,028,647	496,185,101
Total - Fruit, Melons, and Vegetables	35,949	14,666,166	1,514,024	666,891,301

Sources: USDAf, USDAg

Table 14: Mexico: Share of U.S. Market for Selected Fresh Vegetables and Melons, 1988-1989

Commodity	Market Share		Mexico's Major Shipment Period
	1988	1989	
	%	%	months
Broccoli	2.6	2.2	Year-round
Bell Peppers	25.9	26.1	Jan-Apr, Nov-Dec
Cucumbers	42.6	42.5	Jan-Apr, Nov-Dec
Dry Onions	6.9	6.2	Jan-June, Nov-Dec
Cantaloupe	13.8	21.2	Jan-June, Oct-Dec
Honeydew	15.5	22.6	Jan-June, Oct-Dec
Watermelon	12.3	15.4	Jan-July

Source: USDAg

Despite its growing role as a producer and exporter of fresh horticultural commodities, Mexico also imports fruits and vegetables. Mexican imports of vegetables, fruits, and nuts averaged about \$20.8 million through the 1970s, increased to \$262 million in the early 1980s, and subsequently declined to an average of about \$63 million through 1987 (Hall and Livas-Hernandez). The U.S. exports modest volumes of various fruits and vegetables to Mexico. Mexican imports of horticultural commodities from the U.S. averaged \$14.7 million between 1985 and 1989, only about 2% of the value of U.S. horticultural imports from Mexico during the same period (see Table 13). Mexico imported an average of \$4.5 million of fresh U.S. vegetables between 1985 and 1989, including celery (\$.5 million), onions (\$.7 million), and potatoes (\$.7 million). Mexican imports of fresh U.S. deciduous fruit (\$22.4 million) were modest in 1989 but represented a significant increase of \$6.9 million from the previous year, largely the result of lower Mexican trade barriers. Major U.S. deciduous fruit exports to Mexico in 1989 included pears (\$3.7 million) and apples (\$2.4 million). Over 82% of U.S. apple shipments to Mexico in 1988 were in the March-to-July window, whereas pears enjoy a good market over the entire year. U.S. citrus exports to Mexico are variable. Oranges tend to be imported in July and August. U.S. onion shipments to Mexico come during late summer and fall. Potato exports peak in December and then again in June and August. Celery is exported to Mexico all year.

Citrus Fruits and Juices

Worldwide, fresh orange exports from Mexico have averaged about 35,000 mt per year since 1975 of which the U.S. accounts for a major share in most years. In 1989, for example, almost all fresh orange exports were destined for the U.S. In most years, however, about 50% of total fresh Mexican orange exports enter the U.S. market. While important in the late 1970s, grapefruit exports from Mexico declined during the 1980s reflecting low and uncertain supplies. Mexican grapefruit exports peaked at 25,000 mt in 1980 after which the importance of the processed market and several U.S. freezes have increased the variability and reduced the volume of Mexican grapefruit exports. Mexico exported just 2,400 mt of grapefruit in 1989, only a small share of which (653 mt) entered U.S. markets. This compares to the relatively high proportions exported to the U.S. from Mexico in previous years. Global Mexican grapefruit juice exports in 1989 were 947 mt of which 96% (911 mt) entered the U.S. (USDAb).

U.S. citrus imports from Mexico averaged 40,000 mt during the 1980s. However, imports almost doubled between 1985 and 1988 from 32,000 mt to 63,000 mt after dropping off to about 47,000 mt in 1989. Mexico has supplied over two-thirds of all citrus imported by the U.S. since 1987. Although U.S. imports of grapefruit from Mexico declined to almost zero over that period, orange

imports from Mexico increased from 7,000 mt to 12,000 mt. Most of the difference has been composed of Persian limes, which reached 35,000 mt of imports into the U.S. in 1989. Imports of Key limes from Mexico had been prohibited due to citrus canker. However, the Animal and Plant Health Inspection Service (APHIS) recently ruled that what had previously been considered "canker" was actually "alternaria" which does not require a quarantine (USDAC).

Although the major Latin American market for U.S. citrus, Mexico is only a small purchaser of U.S. citrus. Mexican imports of 3,754 mt of U.S. citrus in 1988/89 represented less than 1% of total U.S. citrus exports (USDAC). U.S. citrus exports to Mexico were highly erratic during the 1980s. After averaging almost 2,000 mt during the last half of the 1970s, U.S. citrus exports to Mexico quadrupled between 1979 and 1981. The Mexican debt crisis of 1982, coupled with a U.S. freeze, reduced Mexican imports of U.S. citrus to only 700 mt in 1982. Exports eventually recovered, reaching a record 4,800 mt by 1985. By 1989, however, U.S. citrus exports to Mexico had slipped again to 3,700 mt. U.S. orange and grapefruit exports to Mexico were 1,300 mt and 300 mt, respectively, that year. The balance was composed mostly of lemons (1,850 mt). Mexico imported only 61 mt of grapefruit juice in 1990, all from the U.S.

Cotton

Mexico was one of the top five cotton exporters in the world until the mid-1970s, exporting more than half of its domestic production. Although Mexico is still a net exporter of cotton, the area planted to cotton in Mexico declined by about 75% between the early 1960s and the late 1980s (Taylor). The drastic reduction in Mexican cotton output since the mid-1970s has led to a continual decline in Mexican exports to an annual average under 400,000 bales since 1989. Annual consumption has remained relatively stable at about 750,000 bales. Imports, however, have been increasing in order to keep up with the demands of the domestic textile industry. Mexico imported 180,000 bales in 1986, 60% of which come from the United States. Mexico imported around 100,000 bales in 1989.

The U.S., on the other hand, leads the world in cotton exports, accounting for over one-fourth of world trade. Mexico is a minor market for U.S. cotton, accounting for only about 1.6% of U.S. exports in 1989 (Taylor). Much of the global trade in cotton is subject to restrictions such as the U.S. import quota and export controls in some of the major producing countries. U.S. trade in textiles and other cotton products is subject to the import controls imposed under authority of the Multi-Fiber Arrangement. The U.S. imported only 435 mt of cotton in 1989/90, of which nearly 60% came from Mexico. The U.S. market accounts for only a small portion of total Mexican exports of cotton.

Dairy Products

Mexico historically has been a major customer for U.S. dairy livestock and products. Mexican imports of U.S. dairy products increased 85% from 1987 to 1988 and 33% from 1988 to 1989. The U.S. exported nearly 3 billion lb (on a fluid-milk-equivalent basis) of dairy products in 1989 to Mexico at a value of \$182 million. The Mexican share of U.S. dairy exports increased from 15% in 1987 to 54% in 1989. The value of U.S. dairy product exports to Mexico, however, represented less than 0.5% of total U.S. milk production in 1987 and only 2% in 1989 (Schulthies and Schwart). Mexico is also the leading importer of U.S. dairy breeding cattle. In 1989, Mexico imported 26,485 hd of dairy breeding cattle (65% of all U.S. dairy cattle exports) valued at nearly \$25 million. Dairy cattle exports to Mexico in 1990 are estimated to have been more than 30,000 hd (USDAC).

Surplus U.S. government stocks of non-fat dry milk (NFDM) and cheese have been the main source of U.S. dairy exports to Mexico. An easing of Mexican import restrictions, however, has boosted U.S. exports of finished dairy products to Mexico. U.S. dairy exports to Mexico in 1989 included primarily NFDM (74% of the total) followed by dry whole milk and cream (21%), fluid milk and cream (2%), evaporated and condensed milk (1%), butter and milk fat (0.5%), cheese and curd (0.5%), condensed canned milk (0.2%), and other dairy products (0.5%) such as fluid whey and ice cream. Finished U.S. fluid products are more prevalent in the northern frontier area of Mexico along the border than in the interior. Also, some U.S. firms have processing plants in Mexico.

Mexico does not export dairy products. All Mexican-produced dairy products are consumed domestically due to domestic milk production shortfalls. Strict U.S. milk safety regulations prevent milk and milk products not meeting U.S. standards from legally entering the U.S. from any country. Although some of the Mexican dairy industry is well developed, much of it utilizes old technology that is not allowed for use in U.S. commercial milk production or processing.

Barriers to U.S.-Mexico Agricultural Trade

Both the U.S. and Mexico utilize a wide variety of policy instruments that both directly and indirectly affect agricultural trade between the two countries. Principal U.S. agricultural policies that directly affect agricultural commodity trade with Mexico include export subsidies of various types, import tariffs particularly for fruits and vegetables, and quotas primarily for sugar, cotton, and beef (Table 15). A number of other U.S. policies and regulations intended to achieve largely unrelated objectives also affect U.S.-Mexico agricultural trade, including target prices and deficiency payments

Table 15: U.S.: Principal Barriers to Free Trade

	Fruits and Vegetables	Grains	Livestock and Meat	Cotton
Exports:				
Subsidies		✓	✓	✓
Target Prices & Deficiency Payments		✓		✓
Imports:				
Tariffs	✓			
Quotas			✓	✓

Table 16: Mexico: Principal Barriers to Free Trade

	Fruits and Vegetables	Grains	Livestock and Meat	Cotton
Exports:				
Export Tax			✓	
Imports:				
Tariffs	✓	✓	✓	✓
Licenses		✓		
Guaranteed Prices		✓		

primarily for grains and cotton, sanitary and phytosanitary regulations, animal health regulations, chemical use/food residue/insect and disease control regulations, and others. Mexican fruit and vegetable producers have also complained that U.S. marketing orders restrict the free flow of their commodities to the U.S. The principal Mexican agricultural policies affecting trade with the U.S. include guaranteed prices for basic crops like corn and beans and associated import licensing requirements, import tariffs on various commodities, and a few minor export taxes (Table 16). Although Mexico also has many health, sanitary, chemical use, and related regulations, they are generally less stringent than those in the U.S. and, therefore, not considered to be directly trade restricting. The less stringent Mexican regulations may indirectly impact U.S.-Mexico agricultural trade, however, as discussed in a later section.

All of the policies employed by both the U.S. and Mexico affecting agricultural commodity trade between the two countries can be grouped into three general categories: (1) tariff barriers, (2) non-tariff barriers, and (3) domestic agricultural policies. Tariffs are applied by both countries on a number of commodities. Non-tariff barriers include import quotas, import licensing systems, export subsidies or assistance programs, customs and administrative entry procedures, industrial, health, and safety standards, and packaging/labelling requirements. Domestic agricultural policies include the farm price support programs in both countries and related policies.

U.S.-Mexico Tariff Barriers

The U.S. charges import tariffs ranging up to 20% *ad valorem* on most major agricultural commodities (Table 17). The U.S. import tariff is .05% to 37.6% for fruits and vegetables (depending on the particular commodity), 1.5% for livestock, 6% for meats, 3% to 20% for citrus, and 0% to 20% for dairy products. The U.S. charges no import tariff on grains or cotton.

Mexico historically has charged tariffs as high as 100% on some agricultural commodity imports, particularly before the mid-1980s, as part of an overall economic development strategy of import substitution. The external debt and economic crisis of the early 1980s, however, forced a change in Mexican economic policy to abandon import substitution as the model for development in favor of open markets and trade. As one part of that adjustment, Mexico acceded to the General Agreement on Tariffs and Trade (GATT) in 1986. As a condition of membership in GATT, Mexico agreed to reduce its average import tariff level from around 80% to about 50%. Mexico, however, has unilaterally gone much further than required, reducing the average tariff level to currently around 10% to 20%. For fruits and vegetables, the Mexican import tariff is 0% to 20%, depending on the

Table 17: U.S. and Mexico: Import Tariffs for Major Agricultural Commodities, 1990

	U.S.	Mexico
	<i>ad valorem</i> percentage equivalent	
Fruits and Vegetables	0.05-37.6	0-20
Cotton	0	10-15
Livestock	1.5	0-20
Meats and Edible Offal	6	0-20
Citrus	3-20	20
Dairy Products	0-20	0-20
Grains	0	0-10

Source: USDAC

commodity. The tariff level is 10% to 15% for cotton, 0% to 10% for grains, 0% to 20% for livestock and meat, 20% for citrus, and 0% to 20% for dairy products (Table 17).

U.S.-Mexico Non-Tariff Barriers

U.S. policies that may act as non-tariff barriers to U.S.-Mexico trade include section 22 import quotas, federal marketing orders, sanitary and phytosanitary regulations, animal health regulations, chemical use, food residue, insect, and disease control regulations, and others. The main non-tariff barrier employed by Mexico is the import licensing system. Mexican non-tariff barriers also include many of the same type of food safety and animal and plant disease/pest control regulations that the U.S. requires. U.S. agricultural trade with Mexico is also hampered by the underdeveloped Mexican transportation infrastructure, Mexican transportation regulations, and cumbersome customs clearance procedures.

U.S. Non-Tariff Barriers

Import quotas are authorized by section 22 of the Agricultural Adjustment Act of 1933 (as amended) for price-supported commodities if it is determined that imports undermine the integrity of the respective price support program. Major section 22 commodities include dairy products, sugar, peanuts, and tobacco. Mexico, however, accounts for only a small percentage of U.S. imports of those commodities.

Federal marketing orders allow agricultural producers to regulate the marketing of their commodities to achieve orderly marketing through unified action. Imported commodities are subject to the same regulations as domestically produced commodities. The major U.S. marketing orders affecting U.S.-Mexico trade are the milk marketing orders and fruit and vegetable marketing orders. Milk marketing orders set minimum prices that processors must pay for fluid-grade milk based on the use processors make of the milk. To the extent that these orders raise prices, the prices of milk and milk products for export to Mexico (and elsewhere) are higher as a result.

The intent of fruit and vegetable marketing orders is to improve the level and stability of producer returns through control of quality, market flow, and volume management. Quality is controlled by setting standards of minimum grades and sizes of products that may be marketed. Market flow is regulated by limiting the quantity of the product that can be moved during a given week into the fresh market during the heaviest marketing season. Volume is managed through regulations that limit the supplies of the stored commodity that can come onto the market. Not all U.S. horticultural products are subject to marketing orders (Table 18). Legislation is pending, however, to expand the number of such products covered by marketing orders (GAO). Mexican fruit and vegetable producers argue that the marketing orders discriminate against import of their commodities. U.S. producers counter that the orders apply to fruits and vegetables produced domestically as well as in other countries and do not differentiate among commodities by source.

Sanitary and phytosanitary regulations, animal health regulations, chemical use, food residue, insect, and disease control regulations, and other similar food safety and pest-related regulations also act as barriers to the free flow of agricultural commodities between the U.S. and Mexico. The express intent of such regulations involves the protection of national health and the control of devastating plant diseases and pests. For example, the U.S. maintains a quarantine that prevents the import of citrus from several Mexican states. These measures are related to plant health and sanitary problems such as citrus canker and Mexican fruit fly infestation. To the extent that Mexican agricultural commodities and food do not meet the standards set by the regulations, however, they undoubtedly restrict the free flow of commodities from Mexico into this country.

Mexican Non-Tariff Barriers

Mexico has historically relied heavily on *import licensing* to control imports. Recently, however, Mexico has replaced import licenses for many commodity imports with import duties. In some cases the duties are seasonal. Nevertheless, a number of agricultural products important to the

Table 18: U.S.: Horticultural Commodities Subject and Not Subject to Marketing Orders

Subject to a Marketing Order	Not Subject to a Marketing Order	Proposed Additions
Avocados	Cucumbers ^a	Kiwifruit
Dates	Eggplants	Nectarines
Filberts	Green Peppers	Papayas
Grapefruit	Mangoes	Peaches
Irish Potatoes		Pears
Limes		Plums
Olives		
Onions		
Oranges		
Prunes		
Raisins		
Table Grapes		
Tomatoes		
Walnuts		

^a Currently there is a proposal to establish a marketing order for greenhouse cucumbers.
Source: GAO

U.S. still require import licenses, including corn, wheat (bread, feed, and durum), barley (feed and malting), dry beans, potatoes, apples, grapes, poultry, and tobacco and products. By the end of 1990, 42% of U.S. farm products exported to Mexico were subject to import controls (USDAC).

Mexican guidelines for issuing import permits are established by participatory committees comprised of government, parastatal, and private sector representatives from several commodity groups. These groups decide how much, when, and by whom each commodity under their jurisdiction is to be imported. Licenses are then issued by the Ministry of Commerce and Industrial Development (SECOFI) based on the committee decisions. To comply with GATT, Mexico must eventually eliminate or justify all its import licensing requirements in the future (USDAC).

The Mexican *land transportation system and infrastructure* has been inadequate to handle the increase in trade Mexico has experienced in recent years (Fuller). The *motor transportation* industry is highly regulated and controlled by a few large trucking firms. Although Mexican motor transportation companies are allowed limited access into the U.S., Mexican law denies access of U.S.

motor transport operators into Mexico. The Mexican government-owned rail system is reportedly outdated and lacks the capacity to carry the increasing cargo from the United States (Fuller). *Mexican storage capacity*, particularly cold storage facilities for meat, fruit, and vegetable products, is also severely limited and roads are in a state of general disrepair. Tremendous delays in loading, unloading, and movement within Mexico are frequently reported. Complicated, lengthy, and cumbersome *customs clearance procedures* at border crossing points add to the delays and the costs of transporting goods to and from Mexico.

Mexican Agricultural Policy and Trade with the U.S.

The *Sistema Alimentario Mexicano* or Mexican Food System (SAM) was introduced in 1980. The goal of SAM was to increase production of basic foodstuffs and decrease dependence on imports. Rainfed areas, located principally in the central highlands, were targeted for expanded production. These areas were considered to have greater potential for marginal increases in production than the irrigated areas (Roberts and Mielke). SAM also emphasized the need to bring new lands into production, including under-utilized pastures and abandoned or unexploited lands. The specific stated objectives of SAM were to achieve self-sufficiency in corn and dry bean production by 1982 and in other basic foods by 1985 (Dupnick and Harston).

Several tactics were employed by the Mexican government in its effort to achieve the objectives of SAM, including higher guaranteed prices, increased production credit (by about 33%), preferential interest rates for farm loans, lower crop insurance premiums (by about 3%), subsidies on fertilizer purchases of up to 30%, and subsidies on purchases of certified seed of up to 75%. At the same time, the Mexican government agreed to assume some of the risk of crop failure by guaranteeing to provide farmers a minimum amount of the crop in the event of a disaster (Roberts and Mielke).

The Mexican Agricultural Development Law (ADL) instituted in 1981 permitted producers on communal and private farms to combine their resources, enlarge their farms to increase production efficiency, and gain easier access to credit. The ADL reversed an old law that threatened expropriation of land for producing forage crops on grazing land and actually encouraged the practice. The ADL penalized owners of idle land, discouraged the practice of dividing farms into units smaller than 5 ha, and reinforced the shared-risks program (Roberts and Mielke).

Despite its aggressive objectives, SAM was considered to be too expensive. The costs of subsidizing physical inputs and crop insurance, while maintaining high producer prices along with

substantial consumer subsidies, became financially burdensome. Consequently, the de la Madrid Administration replaced the SAM with the National Food Program (PRONAL) in 1983. Like SAM, PRONAL objectives included developing rainfed production but without ignoring irrigated areas. PRONAL focused on "food sovereignty" (access to food rather than self-sufficiency). The emphasis was on improving the nutrition of the population by providing sufficient food, whether from domestic or foreign sources. PRONAL also aimed at increasing productivity in the food processing industry and improving food marketing efficiency (Roberts and Mielke). In addition to PRONAL, other agricultural objectives of the de la Madrid Administration included promoting producer organizations, resolving land title disputes, revising charges for water and equipment in irrigation districts to reflect actual costs, and promoting more intensive livestock production.

Since the beginning of the economic crisis in 1982, Mexico has been changing its policy on protectionism, reducing subsidies to producers and consumers and initiating a process of privatizing many inefficient state-owned enterprises. Real interest rates have increased from negative to positive. The peso went from overvaluation against the dollar between 1973 and 1981 to undervaluation subsequently. The higher real interest rates have helped attract foreign capital and the undervalued peso has helped increase exports and decrease imports (Mielke 1989).

Mexico began reducing many tariff and non-tariff barriers to imported products in 1983. In August 1986, Mexico joined the General Agreement of Tariffs and Trade (GATT) and by 1988 reduced its 100% maximum tariff rate to a 20% maximum. Mexico discontinued its "official pricing" policy in 1987 which was used to increase tariff revenue by increasing import prices above the invoice price (Mielke 1989). About 79% of the value of all Mexican imports required import licenses in 1985. By 1989, that percentage had dropped to 43% (Gordillo de Anda). Many of the import licenses have been converted into equivalent tariffs. As noted earlier, however, imports of several key Mexican agricultural commodities considered to be vital to the health and welfare of the rural sector are still controlled by an import licensing system.

In recent years, the main Mexican general economic policy goal has been to reduce inflation. In December 1987, the Mexican government negotiated its first Economic Stability and Growth (PECE) pact, an agreement with labor and private sector interests to place controls on wages, prices, and the exchange rate. A number of similar pacts have been established since 1987 and renewed every year. The pacts have been successful in reducing inflation and restoring economic confidence. Inflation has declined significantly from 160% in 1987 to 52% in 1988 and only 19% in 1989 (USDAC). PECE price controls are imposed on items such as basic foods (tortillas, beans, rice, milk, eggs, and beef), gasoline, electricity, electricity for irrigation, and diesel fuel (USDAC).

The two main stated goals of current Mexican agricultural policy are: (1) to achieve self sufficiency in the most important food crops through an increase in agricultural production and production efficiency and (2) to improve the standard of living of rural people. Particular attention is given to the production and distribution of basic food stuffs (SARHc). By increasing the irrigated acreage of corn, rice, and dry beans and providing more technical production inputs, the Mexican government hopes to achieve self-sufficiency in those crops by 1994 (USDAc). For the first time since the early 1980s, the Mexican government increased the budget for SARH (the Mexican Agriculture and Water Resource Ministry) in real terms in 1990. The SARH budget was doubled over the 1989 level and will reportedly concentrate on infrastructure and irrigation projects.

The main tools of Mexican internal agricultural policy have included price support programs, input subsidies, enhanced availability of production credit at below-market rates, and fiscal transfers consisting of technical assistance and expenditures on research, infrastructure improvement, etc. (Table 19). The National Company for Popular Subsistence (CONASUPO) is the Mexican government parastatal agency which regulates the market for basic foods and controls imports of agricultural products. CONASUPO operates the farm price support program of guaranteed prices in which producers have the option to sell their crops to CONASUPO at the guaranteed price or sell them on the open market. Because production of many key commodities like wheat, corn, and beans in Mexico has fallen short of consumption in most years, CONASUPO has been able to avoid large take-overs of agricultural crops by not allowing imports of controlled commodities until the entire domestic production is harvested and sold. Imports are kept out by requiring import licenses which the government does not issue until domestic supplies clear the market.

The movement toward more open markets over the last few years in Mexico, however, has included the removal of the import license requirement for many agricultural commodities. The resulting increase in imports of those commodities has put significant downward pressure on farm prices and forced the government either to face rising budget costs and government agricultural commodity inventories or to reduce the level of farm support. Consequently, CONASUPO has moved to drop price guarantees for many agricultural commodities except corn, beans, and a few other products of strategic importance. A form of "agreement pricing" is now used to set producer prices for many basic commodities such as wheat, barley, sorghum, soybeans, oats, rice. U.S. futures or cash markets plus transportation costs are used to set producer prices for soybeans and sorghum. Producer representatives and end users, with the government as a mediator, meet to determine prices for sugar and barley (USDAc).

Table 19: Mexico: Internal Agricultural Support Programs

Subsidies	Policy Instruments	Intervening Institutions
Prices	Price support programs of guaranteed and agreement prices, guaranteeing the purchase of domestic crops at a fixed minimum price which has generally exceeded the world market price.	SARH, Agricultural Cabinet, SECOFI.
Credit	Agricultural credit for basic products at preferential rates, below market rates through: • BANRURAL • FIRA Crop and livestock insurance through: • ANAGSA (AGROASEMEX)	BANRURAL, FIRA, FICART, Commercial Banks, ANAGSA (AGROASEMEX), SHCP.
Inputs	Provision of inputs for production at prices below market levels for: • Water for irrigation • Electricity for pumping water • Fertilizers • Pesticides • Seeds • Marketing and transportation • Fuel	SARH, CONAGUA, FERTIMEX, FERRONALES, SCT, SHCP, PEMES, PRONASE, SEMIP
Fiscal Transfers	Fiscal transfers from the Federal Government to producers, through such programs as: • CEPROFIS • Technical assistance • Phytosanitary control • Research and development • Construction of infrastructure	SARH, SPP

Source: Grennes, et. al.

CONASUPO no longer purchases basic commodities to support prices under this new scheme. The end users participating in the agreement, however, must purchase all the domestic production before they can resort to imports to meet their needs. As a consequence of these changes, the role of CONASUPO increasingly is to market and distribute agricultural commodities to the rural population and the urban poor in Mexico. A new food distribution policy also encourages expansion of private sector food processing and distribution to service the middle and upper classes of Mexican society (USDAC). The 1990 CONASUPO budget was \$2.4 billion dollars, 24% more than in 1989.

As part of the current Mexican farm policy restructuring, untargeted input subsidies on water, electricity, fertilizer, transportation, crop insurance, and credit as well as balanced feed subsidies to livestock producers are being eliminated. As a consequence, farm production costs have increased substantially over the last two years. The Mexican government is also transferring water district administration to producers to be run by cooperatives. FERTIMEX, the Mexican government-owned fertilizer monopoly, is also being privatized (USDAC).

To assist in the phase out of the intervention of CONASUPO in the basic crops markets (except corn and beans), the Mexican government established the Support and Services to Agricultural Marketing organization (ASERCA) in 1991 (Grennes, et.al.). ASERCA will administer a system of deficiency payments for producers, administer remaining production subsidies, and facilitate movement of supply to market. Under the ASERCA program, participating producers can deliver their grain to a government storage facility and receive a previously determined price support level. The buyer of the grain at that price receives a certificate of deposit guaranteeing payment of an amount equal to the difference between the price he paid for the grain and the real cost of the grain which can be redeemed at designated banks and used to pay part of the cost of the grain. The remainder of the purchase cost will be financed over 6 months by the designated bank. Financing of the program will be done through a fund created by SARH and the banking system.

Some sense of the extent of the subsidization of the agricultural sector by the Mexican government over the years is provided by the calculation of the "producer subsidy equivalent" (PSE) for specific Mexican agricultural commodities. The PSE measure of government subsidization of agricultural producers was developed by the U.N. Food and Agriculture Organization in the mid-1970s (FAO 1973 and 1975). In general, protection of the production of a given commodity in a given country implies direct or indirect transfers of income from the government to producers of that commodity (Tangermann, Josling, and Pearson). The PSE for a given commodity and country is a measure of that transfer, i.e., the cash payment (subsidy) to farmers that would substitute for all direct and indirect government support policies and result in no change in farm income.

The PSE is essentially calculated as the difference between the domestic and world prices of the commodity of interest times domestic production (which accounts for trade-distorting policies) plus the value of all other government transfers that directly or indirectly support production of that commodity. The PSE is often expressed as a percentage of the value of the domestic production of the commodity. The PSE for a commodity can be positive or negative depending on whether the government has tended to subsidize or tax producers, respectively.

Estimated Mexican PSEs suggest that before the Mexican government began the process of reducing the level of subsidization to the agricultural sector, the highest level of support was for crops, particularly corn and soybeans (Table 20). In general, Mexico tended to subsidize crop, pork, and poultry producers and to tax beef and milk producers. Support for Mexican wheat producers was almost entirely through input subsidization. For corn, sorghum, and soybeans, however, the source of government support was fairly evenly split between border controls/guaranteed prices and input subsidies. Unfortunately, government support for agriculture has been dropping steadily over the last two years so that PSE calculations based on the only available but outdated data are not particularly indicative of the current state of Mexican government support for agricultural producers.

U.S. Agricultural Policy and Trade with Mexico

A number of U.S. farm programs potentially affect Mexican agriculture and agricultural trade with Mexico. Perhaps the most likely to have an impact is the U.S. program of *target prices and associated deficiency payments*, the primary means by which the U.S. government supports farm prices of several key commodities. Target prices are set at above-market levels which encourages an expansion of production. The consequence is lower market prices for those commodities than would otherwise prevail and a greater supply of those commodities available for export at lower prices than otherwise. Thus, the target price/deficiency payment program acts as an implicit consumption subsidy for both domestic and foreign consumers.

At the same time, the lower prices and greater imports of U.S. agricultural commodities by Mexico (and other importing countries) discourages production and puts downward pressure on Mexican farm and market prices of those commodities. Although this program potentially affects the imports of all U.S. export customers, Mexico is the third largest foreign customer for U.S. agricultural commodities and, consequently, is affected relatively more by this program than many others.

FUTURE PROSPECTS FOR U.S.-MEXICO AGRICULTURAL TRADE

To analyze the likely impacts of a U.S.-Mexico FTA on U.S.-Mexico agricultural trade and, therefore, on U.S. agriculture, it is necessary to first consider the changes in U.S.-Mexico agricultural trade that are likely to occur even in the absence of an FTA. Unilateral moves by Mexico to open its economy and reduce the barriers to imports have already contributed to a significant increase in U.S.-Mexico agricultural trade. Undoubtedly, a U.S.-Mexico FTA would further the ongoing process

Table 20: Mexico: Producer Subsidy Equivalents by Commodity, 1982-89

	1982	1983	1984	1985	1986	1987	1988	1989
	----- % -----							
WHEAT								
Border Controls and Price Supports	-28.65	-30.88	7.70	16.71	-7.73	-4.01	6.32	4.16
Input Subsidies	35.74	37.79	25.90	27.25	35.99	31.25	26.83	24.32
Exchange Rate Adjustment	22.57	25.90	1.92	2.47	26.85	23.08	0.39	-0.97
Total Transfers	29.66	32.81	35.52	46.43	55.11	50.31	33.54	27.51
Total Transfers (w/o Exchange Rate)	7.09	6.91	33.60	43.96	28.26	27.24	33.15	28.48
CORN								
Border Controls and Price Supports	31.72	11.65	31.03	44.24	37.80	54.45	35.21	32.58
Input Subsidies	36.82	19.60	16.42	16.23	22.00	16.89	19.92	14.11
Exchange Rate Adjustment	11.22	15.78	1.26	1.47	14.28	9.59	0.24	-0.58
Total Transfers	79.76	47.03	48.70	61.94	74.08	80.93	55.37	46.11
Total Transfers (w/o Exchange Rate)	68.54	31.25	47.45	60.47	59.80	71.34	55.13	46.69
SORGHUM								
Border Controls and Price Supports	1.59	-34.63	23.23	28.01	45.42	33.37	35.00	25.70
Input Subsidies	31.00	36.89	24.36	22.06	23.82	20.69	16.37	17.82
Exchange Rate Adjustment	17.17	25.13	1.57	2.08	15.19	14.15	0.26	-0.68
Total Transfers	49.75	27.39	49.15	52.16	84.44	68.20	51.63	42.84
Total Transfers (w/o Exchange Rate)	32.59	2.26	47.58	50.07	69.24	54.05	51.37	43.52
SOYBEANS								
Border Controls and Price Supports	6.58	-6.25	20.76	35.43	22.07	40.33	13.65	35.57
Input Subsidies	37.11	35.30	24.54	25.05	26.86	22.50	21.96	18.35
Exchange Rate Adjustment	14.61	18.55	1.41	1.66	17.23	12.21	0.31	-0.58
Total Transfers	58.57	47.60	46.71	62.14	66.16	75.05	35.92	53.33
Total Transfers (w/o Exchange Rate)	43.96	29.05	45.30	60.48	48.93	62.84	35.61	53.92
BEEF								
Border Controls and Price Supports	-24.25	-33.57	-15.80	-21.56	-22.61	-16.74	-4.66	-4.61
Input Subsidies	3.29	6.67	6.34	4.64	2.19	1.58	1.71	0.32
Exchange Rate Adjustment	19.84	24.08	2.06	3.00	26.92	22.69	0.38	-0.92
Total Transfers	-1.12	-2.83	-7.41	-13.92	6.49	7.53	-2.57	-5.21
Total Transfers (w/o Exchange Rate)	-20.96	-26.91	-9.46	-16.92	-20.43	-15.17	-2.95	-4.29
PORK								
Border Controls and Price Supports	-4.36	-13.29	11.70	17.06	10.12	26.07	44.56	36.55
Input Subsidies	1.86	6.24	2.68	0.56	1.29	0.66	1.01	0.19
Exchange Rate Adjustment	18.46	22.39	1.78	2.36	22.41	16.94	0.25	-0.68
Total Transfers	15.97	15.34	16.16	19.97	33.82	43.67	45.83	36.07
Total Transfers (w/o Exchange Rate)	-2.49	-7.05	14.38	17.61	11.41	26.73	45.58	36.75
POULTRY								
Border Controls and Price Supports	30.84	20.72	27.10	30.99	9.09	7.17	26.28	22.54
Input Subsidies	3.03	9.73	4.72	0.15	1.38	0.96	2.19	0.25
Exchange Rate Adjustment	11.06	14.21	1.29	1.70	19.63	17.70	0.26	-0.67
Total Transfers	44.93	44.66	33.11	32.85	30.09	25.83	28.73	22.12
Total Transfers (w/o Exchange Rate)	33.87	30.45	31.82	31.15	10.46	8.13	28.47	22.79
MILK								
Border Controls and Price Supports	-4.99	-5.10	-2.59	-2.09	-3.23	-3.82	-6.12	-6.53
Input Subsidies	2.61	7.86	3.73	0.71	1.91	1.34	2.80	0.36
Exchange Rate Adjustment	0.74	0.85	0.04	0.05	0.66	0.69	0.02	-0.05
Total Transfers	-1.65	3.61	1.18	-1.33	-0.66	-1.79	-3.30	-6.23
Total Transfers (w/o Exchange Rate)	-2.38	2.76	1.13	-1.38	-1.33	-2.48	-3.33	-6.18

Source: Grennes, et. al.

of liberalization and push the volumes and composition of U.S.-Mexico agricultural trade in directions consistent with current trends with some exceptions.

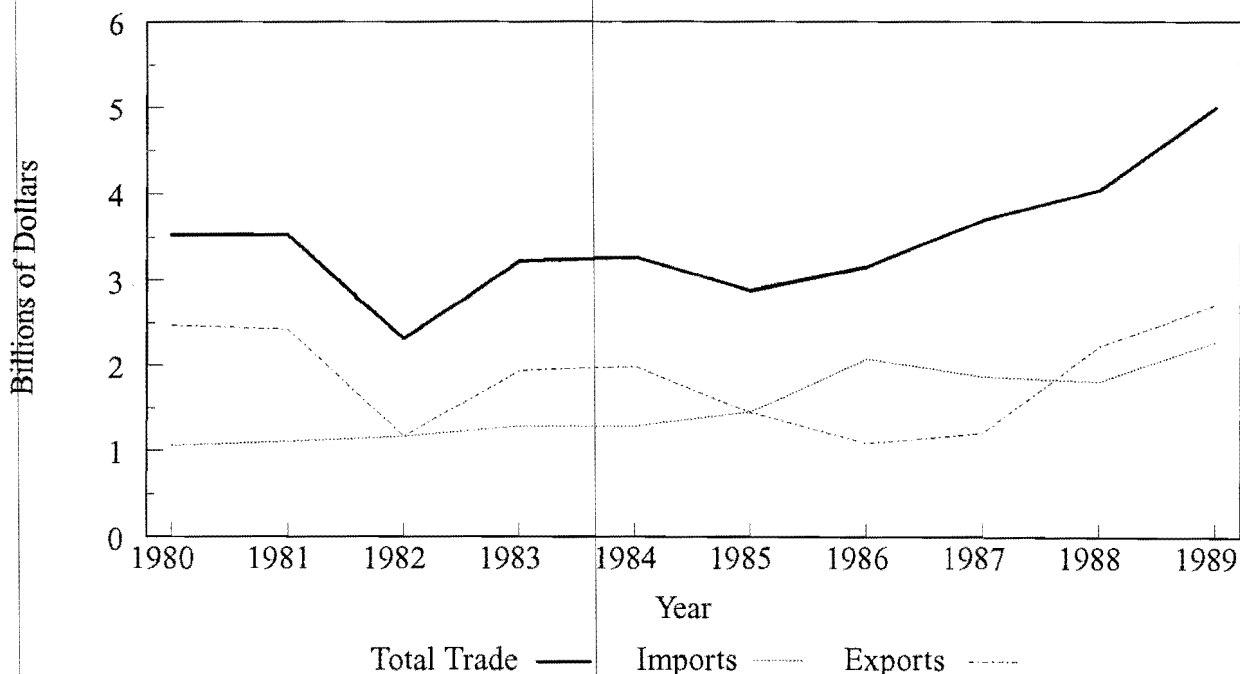
Consequently, this section first considers the prospects for U.S.-Mexico agricultural trade assuming that current trade trends prevail and that no further liberalization of agricultural trade between the two countries occurs. That is, it is first assumed that either the U.S. and Mexico fail to come to terms on an FTA or that any FTA that is signed between the two countries fails to provide for significant additional liberalization of U.S.-Mexico agricultural commodity trade. Then, likely changes in U.S.-Mexico agricultural trade under a U.S.-Mexico FTA are considered.

U.S.-Mexico Agricultural Trade Prospects Without an FTA

U.S.-Mexico agricultural trade has increased dramatically since Mexico acceded to GATT in 1986 (Figure 13). The total value of bilateral agricultural trade between the U.S and Mexico doubled from \$2.89 billion in 1985 to \$5.01 billion in 1989. Given the unilateral trade liberalization already undertaken by Mexico and the rapid course towards privatization set by the Salinas Administration, current trends in agricultural trade growth are expected to continue even without an FTA.

Without a U.S.-Mexico FTA, the future pattern of U.S.-Mexico agricultural commodity trade should continue to reflect the current comparative advantages of each country in agriculture as distorted by government policies. Determining *comparative* advantage in international production and trade of particular commodities between countries, however, is a hazardous, if not impossible, task. True comparative advantage can be severely distorted by government intervention in trade and, therefore, is largely unobservable. As a result, most authors refer to *competitive* advantage which is readily apparent in the direction of trade flows. In other words, even if the U.S. has a comparative advantage in the production and export of a particular commodity as a result of its endowments of resources and technological advancements, Mexican domestic and trade policies (producer price supports and subsidies, import restrictions, and/or export incentives) can distort trade flows and capture a *competitive* advantage in that commodity.

Although a particular country may have both a comparative and competitive advantage in the production and export of a particular commodity, the extreme level of government policy distortions of world trade patterns makes it difficult to distinguish between the two. Consequently, *competitive* advantage is generally defined by observed world trade patterns while *comparative* advantage normally refers to what those trade patterns would be like in the absence of policy distortions.

Figure 13: U.S. Agricultural Trade With Mexico, 1980 - 1989

Through negotiated changes in domestic and trade policies, a U.S.-Mexico FTA would likely have an impact on the agricultural competitive advantage and the pattern of agricultural trade between the two countries. Without an FTA, however, U.S.-Mexico trade is likely to continue growing along the current lines of competitive advantage. Nevertheless, a number of factors will likely constrain the rate at which trade develops between the two countries and define the pattern of trade as it develops. First, growth of U.S. agricultural exports to Mexico will continue to be highly dependent on the pace of economic development in Mexico. Without an FTA, a sufficient rate of economic growth in Mexico to sustain long-term growth in agricultural trade between the two countries may not be attainable.

Second, continued growth in Mexican agricultural exports to the U.S. may require significant investments in production, marketing, storage, and distribution capacity and technology as well as transportation and other supporting infrastructure. The additional trade generated by the process of unilateral trade liberalization by Mexico over the past several years has already pushed Mexican production of many commodities to the limits defined by existing capacity, technology, and

infrastructure. Perhaps the major accomplishment of an FTA would be the creation of an economic climate conducive to increased foreign, private capital investments in Mexico. Without an FTA, the possibilities of generating a sufficient influx of foreign capital to fuel growth in Mexico may be limited. Without additional investment in Mexican infrastructure, the consequences over the long run may involve a slow decline over time in any agricultural competitive advantages that Mexico may have gained through the process of economic reform and unilateral liberalization.

Third, the current land tenure system in Mexico discourages the development of large, efficient farms. Thus, most agricultural commodities are grown on small, relatively less efficient units of land. The land tenure system, however, is currently undergoing some changes that may allow for smaller farms to merge into larger, more efficient production units. Such changes may provide a relative advantage to cattle production and similar extensive agricultural production activities and lead to increased efficiency in Mexican agricultural production over a broad range of commodities.

Finally, a number of existing Mexican policies and laws from trucking regulations to different commodity standards and regulations than in the U.S. will continue to disrupt and restrict the flow of agricultural commodities between the two countries. The Mexican government is currently pursuing some policies intended to enhance existing competitive advantages of some commodities, particularly horticultural products. For example, Mexico is encouraging the production of horticultural commodities for export by providing producers with free market information and profit comparisons of horticultural products with other commodities (USDAC).

U.S.-Mexico agricultural trade data suggest that Mexico currently has a competitive advantage in the production and export of at least feeder cattle, many horticultural products, and citrus. The U.S., on the other hand, appears to currently enjoy a competitive advantage in the production and export of breeding and slaughter livestock, dairy products, meat (particularly beef), most feed and food grains, and possibly cotton (Table 21).

Growth in U.S. agricultural product exports to Mexico in recent years is the result of two major forces: (1) internal adjustments in Mexico from enhanced access by Mexican consumers to lower cost foods and feeds produced in the U.S. than are available in Mexico and (2) some real economic growth achieved over the last few years in Mexico from more open markets and privatization. Without an FTA, most of the impetus for continued growth in U.S.-Mexico agricultural trade must come from continued overall economic and per capita income growth as a result of either increased market efficiency as privatization continues or increased foreign capital investments in

Table 21: U.S. and Mexico: Apparent Competitive Advantage in Production and Trade of Agricultural Commodities

	U.S.	Mexico
Breeding Livestock	✓	
Feeder Cattle Production		✓
Livestock Fattening	✓	
Meat	✓	
Dairy	✓	
Horticulture		✓
Citrus		✓
Cotton	✓	
Grain	✓	

productive activities in the Mexican economy. In contrast, Mexican exports of horticultural products, feeder cattle, and other agricultural commodities to the U.S. have not grown, in general, as a result of Mexican economic or trade policy but rather as a result of growing U.S. demand and, in the case of some horticultural commodities, weather-related reductions in U.S. production.

Prospects for Livestock and Livestock Product Trade with Mexico

U.S. exports of nearly all livestock and products to Mexico have grown since the mid-1980s, albeit somewhat erratically, along with the slow recovery in the Mexican economy. In general, future growth in those exports will be tied directly to the rate of growth in the overall economy. At a minimum, future growth in U.S.-Mexico livestock and product trade is expected to follow past trends unless the reorganization and reorientation of the Mexican economy fails to generate additional growth. The specific prospects for U.S. livestock and livestock trade with Mexico may differ somewhat by animal type.

Prospects for Cattle and Beef Trade with Mexico

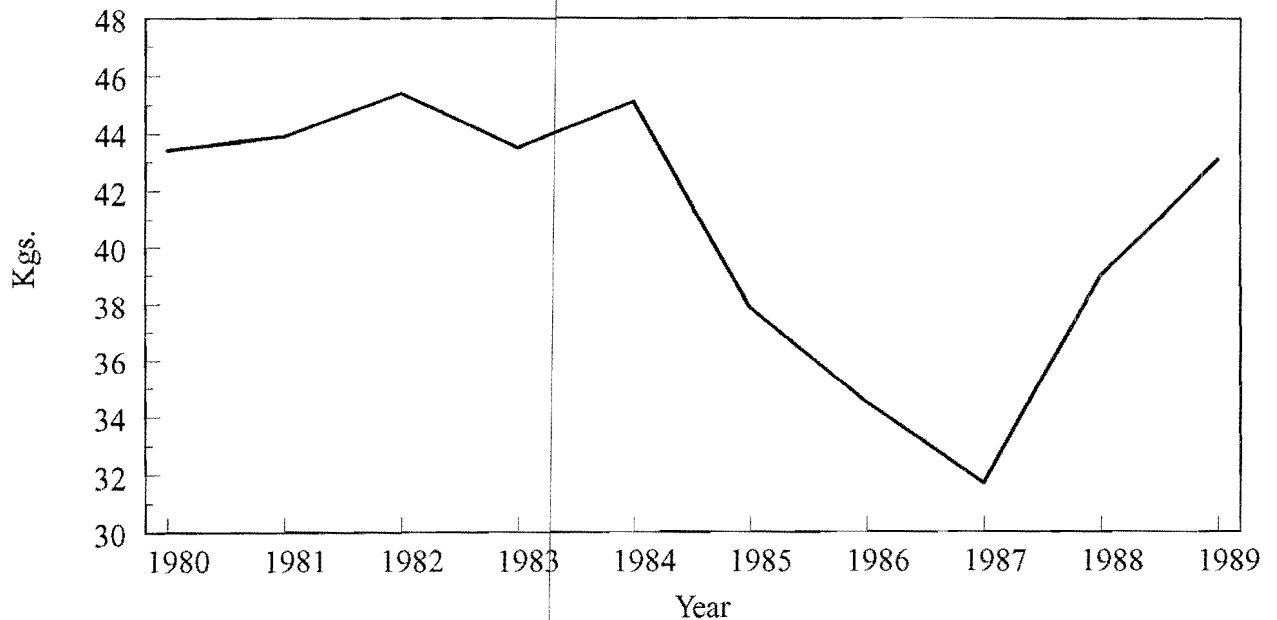
Recent growth in U.S. cattle and beef exports to Mexico is largely the result of the inability of the Mexican cattle industry to compete with the U.S. in response to a turnaround in Mexican demand for meat since 1987 (Figure 14). The Mexican cattle herd has been declining since the early 1980s¹ as the result of several key events. First, a severe, three-year drought in the main cattle production areas of Northern Mexico has forced herd liquidation and reduced the supply of potential replacement cattle. At the same time, an increase in beef consumption in Mexico since the mid-1980s resulting from economic recovery, moderate income growth, and lower inflation has added pressure to liquidate cattle herds and breeding animals in particular. Finally, increasing exports of Mexican feeder cattle to the U.S. have reduced the availability of potential replacement cattle in Mexico.

With the return of favorable weather and abundant forage in almost all cattle producing states in Mexico, however, conditions are right for some recovery in Mexican cattle inventories. With the elimination of both import controls and guaranteed prices for virtually all feedgrains in Mexico, increased availability of lower cost feedgrains will likely provide some incentive to recapitalize the Mexican cattle production, feeding, and processing industries. Nevertheless, nearly all Mexican barriers to beef imports have also been eliminated while Mexican retail beef prices continue to be controlled by the government. Consequently, Mexican cattle producers and foreign investors are reportedly still not particularly interested in investing heavily in plant and equipment to expand the Mexican cattle industry (USDAC). Given beef price controls and rising input costs, many Mexican cattle producers will likely focus on improving efficiency and reducing production costs and continue to orient their activities toward the export of feeder cattle.

One implication is that despite the improved weather conditions in major Mexican cattle feeding regions, U.S. exports of beef and fat cattle to Mexico will likely continue to expand over the short to medium term although at perhaps somewhat lower rates than in the past. An increase in Mexican economic growth and incomes, of course, could expand U.S. exports of these products even faster. At the same time, Mexican exports of feeder cattle to the U.S. are likely to continue and grow. The potential upper limit for U.S. feeder cattle imports from Mexico has been estimated to be about 2.33 million hd given the productive capacity of the Mexican cattle sector (Rosson, et. al).

¹ Although official Mexican Government statistics and those of the USDA placed the Mexican herd at 31.7 million hd in 1990 compared to 34.5 million hd in 1980, unofficial Mexican sources have indicated that herd size has declined to about 22-24 million hd, with some estimates placing herd size below 20 million hd.

Figure 14: Mexico: Per-Capita Meat Consumption, 1980 - 1989



Includes beef, pork, and chicken

Source: Rosson et al.

Prospects for Dairy Product Trade with Mexico

Conflicting policy changes in Mexico make it difficult to determine the likely future trends in U.S. exports of dairy products to Mexico in the absence of an FTA. The recent reduction in Mexican dairy cattle import restrictions provides an incentive for increased U.S. exports of dairy cattle to Mexico and increased Mexican dairy production over time. Mexican milk price ceilings are also being removed providing an additional incentive for domestic dairy production. At the same time, however, Mexico has reduced import restrictions for most dairy products and eliminated dairy production input subsidies which provide incentives for imports and constrain Mexican production. Concessional exports of U.S. government stocks of NFDM to Mexico, however, will likely continue to restrain growth in the Mexican dairy industry and stimulate Mexican imports of many U.S. dairy products. Weather patterns will also tend to adversely affect dairy production in Mexico. Drought in some years and excessive rainfall in others in Mexico have tended to significantly lower Mexican milk production over time.

Prospects for Hog and Pork Trade with Mexico

Mexican pork production has fallen by nearly one-third since the mid-1980s. Over the same period, pork imports from the U.S. increased from near zero to 27,000 mt in 1990 despite some decline in Mexican pork demand as a result of poor economic conditions. A shortage of beef at current controlled price levels is encouraging consumers to continue substituting pork for beef, providing incentive for continued imports of U.S. pork. The 20% Mexican import tariff on pork, however, will continue to support domestic pork prices and production and restrain the demand for and imports of U.S. pork.

With the eradication of hog cholera, which has been perhaps the biggest deterrent to growth of the Mexican hog industry, the conditions for investment have improved. Imports of U.S. breeding stock and hog inventories increased in 1991. Mexican demand for U.S. breeding hogs is likely to continue in the short term, providing the basis for continued growth. Increasing availability of cheap U.S. feedgrains will also support expansion efforts.

Over the longer term, given an expansion in domestic demand, the Mexican hog industry will likely modernize and become increasingly productive (USDAC). The Mexican hog industry is generally characterized by medium and small farms unable to achieve economies of scale, poor management, a lack of skilled labor, and poor access to capital and technical resources. Competition from imports has forced the industry to become more concentrated and competitive. Some of the more progressive hog farmers have begun modernizing their production processes and vertically integrating the production, processing, and distribution of pork. The implication is that imports of U.S. pork will likely continue growing but at a slower pace than in the past over the short run and then face increasingly tough competition from domestic producers.

Prospects for Poultry Trade with Mexico

Despite the development of fully integrated production systems similar to those in the U.S. and a 35% increase in production during the 1980s, the Mexican poultry industry has not been able to satisfy increasing domestic demand. Consequently, Mexican imports of U.S. poultry have increased steadily. Mexican poultry consumption has expanded at an annual rate of 11.3% since 1987 and is expected to continue growing. Nevertheless, increasing supplies of cheap feedgrains from the U.S. coupled with restrictive poultry import barriers will provide an increasing investment and growth incentive to the Mexican poultry industry and impair the access of U.S. producers to Mexican markets. Mexico grants only a few poultry import licenses primarily to meet consumption needs in

northern border states (USDAC). Assuming strong growth in Mexican poultry demand, one consequence may be increased investment by the U.S. poultry industry in poultry operations in Mexico to circumvent the import restrictions.

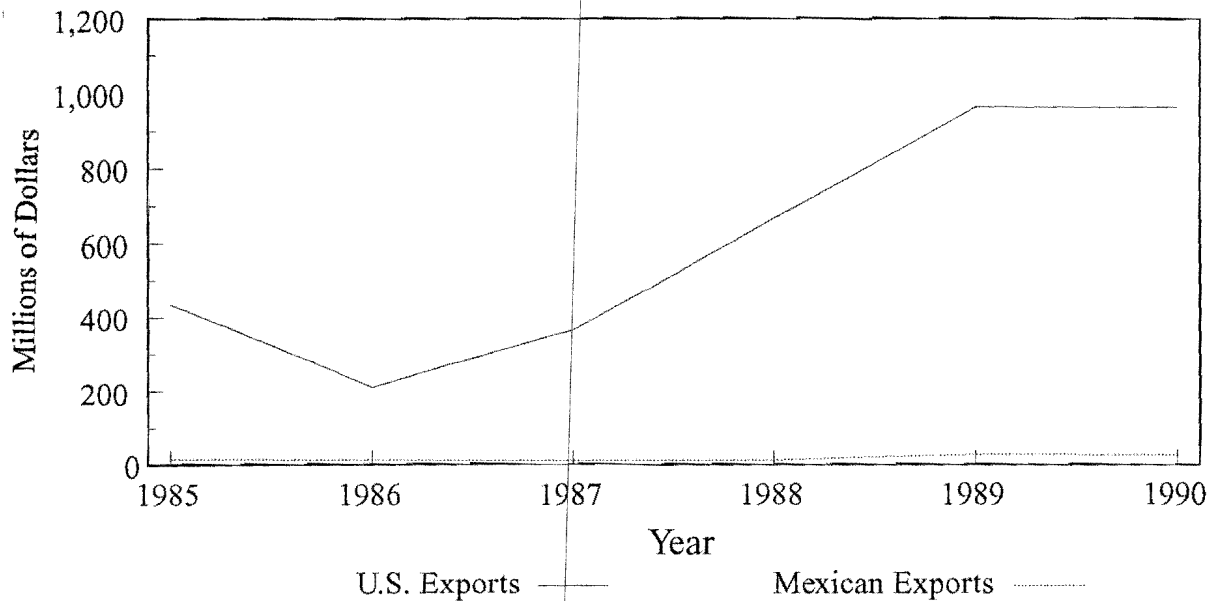
Prospects for Sheep and Goat Trade with Mexico

The supply of lamb, mutton, and goat meat has been relatively tight in Mexico reflecting declining live animal inventories and rapidly increasing demand. Although U.S. exports of lamb and mutton to Mexico have increased somewhat, the major U.S. response has been a dramatic increase in slaughter sheep exports from nothing in 1987 to nearly 400,000 hd in 1990. The imports, consisting mainly of old ewes and rams, are creating severe competition for Mexican sheep and goat producers. Outdated production technology, near-monopoly control of domestic sheep and goat marketing, and limited land availability for production reportedly plague the Mexican sheep and goat industry (USDAC). Because over 70% of the lamb consumed in Mexico is prepared using a traditional, steam-cooking process that tenderizes even old, strong-flavored ewe and goat meat, Mexico has been an excellent market for U.S. sheep producers to dispose of cull animals. Consequently, U.S. exports of sheep and, to a limited extent, mutton to Mexico are expected to continue.

Prospects for Grain Trade with Mexico

The balance between supply and demand for coarse grains and wheat in Mexico has shifted dramatically over the last 30 years with consumption increasing significantly relative to production. As a consequence, Mexico has had to rely heavily on imports from the U.S. to fill the increasing gap between domestic production and consumption. U.S. grain exports to Mexico have nearly doubled since 1985 not only because drought conditions in a number of years reduced Mexican grain production but also because Mexican import barriers have been increasingly relaxed (Figure 15).

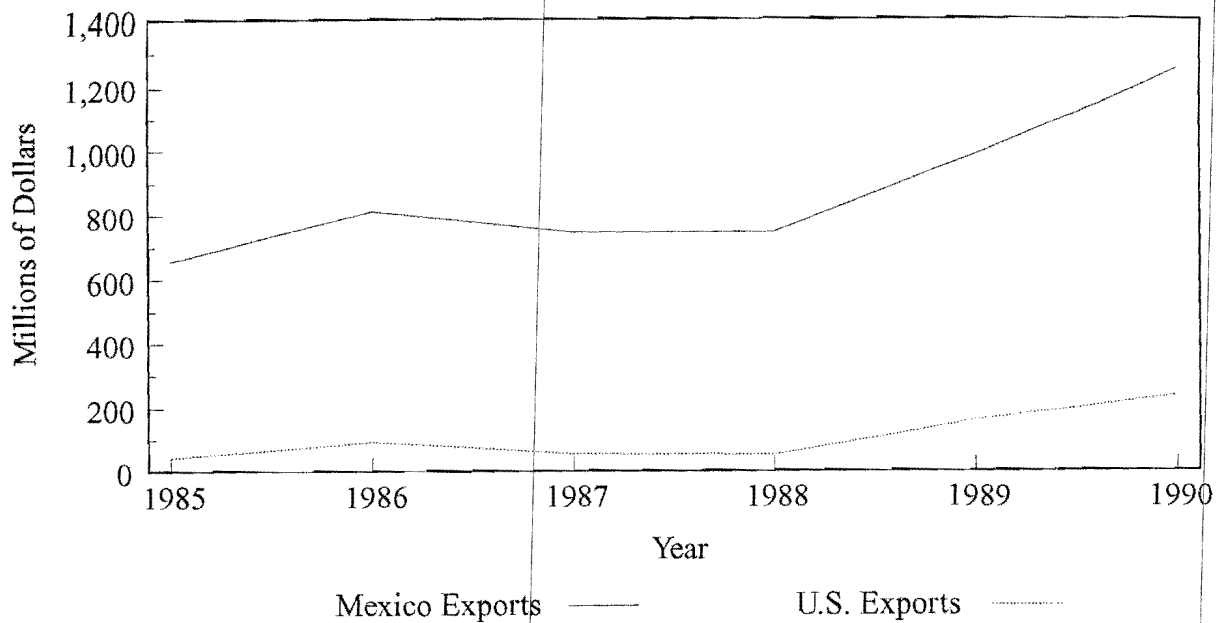
Prospects for U.S. feed grain exports to Mexico depend on the prospects for growth in Mexican feed grain production and in Mexican livestock feeding and dairy industries which depends on the growth in demand for meat and dairy products in Mexico. The prospects for significant growth in Mexican grain production are dim given the recent removal of Mexican barriers to grain, the elimination of input subsidies to farmers for fertilizer, electricity, water, and seed, and the limited availability of additional arable land for expansion. The continued relatively high guaranteed prices for corn and dry beans and uncertainty about government producer-pricing policies for liberalized

Figure 15: U.S.-Mexico Bilateral Grain Trade, 1985 - 1990

Source: USDAb

crops (rice, sorghum, and oilseeds) and even wheat are providing Mexican farmers with strong incentives to shift their acreage into corn and dry beans and out of most other grains (USDAb).

On the other hand, current recapitalization of the Mexican cattle and hog industries and increasing investment in the Mexican poultry industry along with improving Mexican meat consumption bode well for a continued strong performance of U.S. feedgrain exports to Mexico. Removal of the import license requirement for most grains except corn, wheat (bread, feed, and durum), barley (feed and malting), and dry beans and the continuing elimination of all input subsidies should eliminate any competitive advantage to Mexican producers resulting from those policies in the past. The consequence should be an incentive for increasing U.S. exports of feedgrains to Mexico through the 1990s. Feed grains will likely continue to comprise 80% to 95% of total U.S. grain exports to Mexico. Growth in U.S. corn exports to Mexico will be constrained by continuing Mexican government guaranteed price and input subsidy policies for domestic corn producers and the restrictive import license requirement. Corn (yellow) guaranteed prices have been increased from \$US 4.82/bu in 1990 and \$US 5.02/bu in 1991 to \$US 5.11/bu for the 1992 crop year. Import licenses

Figure 16: U.S.-Mexico Bilateral Horticultural Trade, 1985 - 1990

Source: USDAb

continued encroachment of the Mexican production season into the U.S. production and marketing season, and (4) continued U.S. weather problems that have already taken a toll on U.S. production area and capacity, particularly for citrus crops.

Prospects for Cotton Trade with Mexico

The prospects for the volume and pattern of U.S.-Mexico cotton trade depend primarily on government policies and the demand for cotton by the respective textile industries. Although a net exporter of cotton, Mexico imports some U.S. cotton to mix with and upgrade domestic cotton because U.S. cotton is generally of higher quality than Mexican cotton. The value of U.S. cotton exports to Mexico has increased more than six-fold since 1988, primarily because of rising prices for synthetic fibers and increased investment in Mexican textile production (Figure 17).

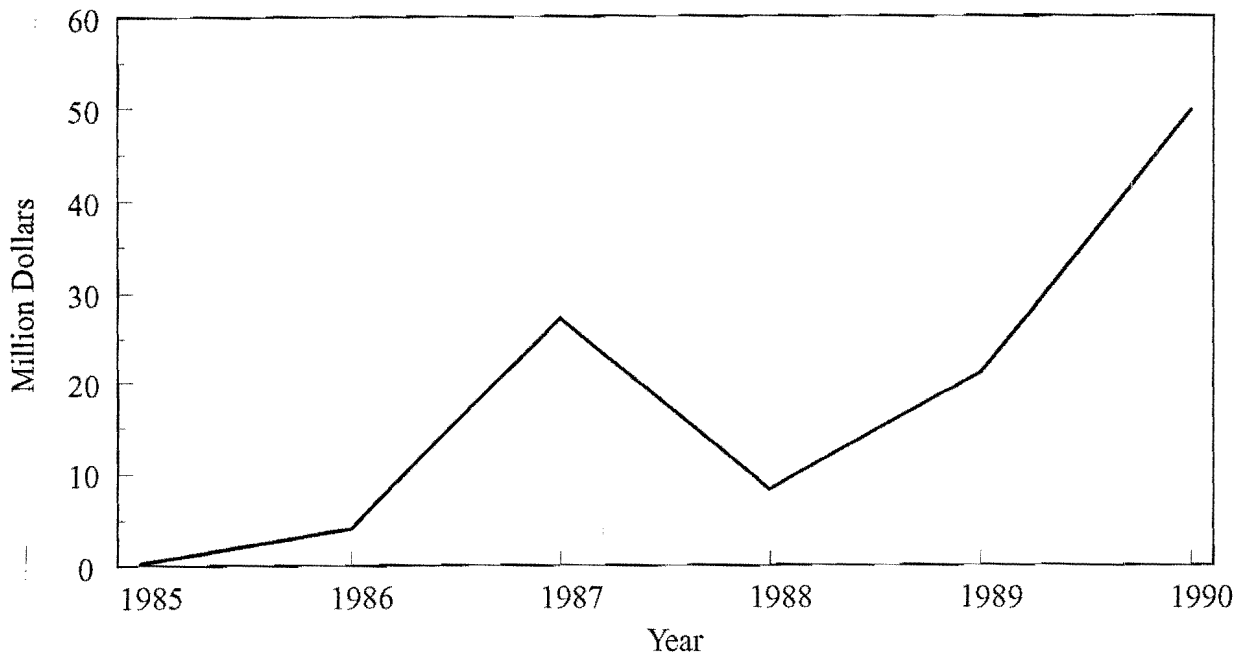
for corn are not generally made available until after the domestic corn crop is harvested and sold each year. Even though the Mexican government has made self-sufficiency in corn a top policy priority, erratic rains and limited new arable land will make that goal difficult to achieve. At a minimum, government policy will hinder the growth of U.S. corn exports to Mexico.

Although domestic wheat production has been able to satisfy or exceed demand during brief periods over the last 30 years in Mexico, the rapidly growing population and improving real wage rates in Mexico will not likely allow the country to attain self-sufficiency in wheat production as has been the long-term goal. Advanced technology similar to that in the U.S. is already used to produce most of the wheat harvested in the major wheat producing areas of northwest Mexico and large areas of wheat are already under irrigation. Given the constraints on the availability of additional arable land and water for irrigation and the removal of wheat import barriers and input subsidies, the possibilities for significant additional wheat production in Mexico even in response to strong demand are limited. Most likely, Mexico will likely be forced to supplement its growing wheat needs with increasingly larger imports from outside its borders. Prospects for continued growth in U.S. wheat exports, consequently, are largely dependent on the prospects for overall economic growth in Mexico.

Prospects for Horticultural Product Trade with Mexico

Mexico has captured an increasing share of the U.S. market for fresh fruits and vegetables. The value of Mexican horticultural exports to the U.S. has almost doubled in the last 6 years (Figure 16). This trend is likely to continue as Mexican farmers have increased planting options on their land. Vegetable and fruit production will likely become a more attractive alternative as the Mexican government continues to decrease input and price subsidies for basic crops and to increase the promotion of export-oriented crops. Mexican fruit and vegetable exports to the U.S. will likely be limited to some degree, however, by seasonal tariffs in the U.S.

U.S. exports of certain horticultural products to Mexico (including dried pulses, mostly legumes, pears, apples, celery, onions, potatoes, oranges, and others) have also increased substantially since 1985 (Figure 16). The horticultural products exported to Mexico from the U.S. are primarily those for which U.S. yields are much in excess of those in Mexico, the climatic conditions preclude significant production in Mexico, or production seasons are complementary between the two countries. In any case, U.S. exports of these products to Mexico will likely continue to grow but will be somewhat constrained by four factors: (1) Mexican import tariffs, (2) investments in Mexican production and processing technology that boost production yields and processing efficiency, (3)

Figure 17: U.S. Cotton Exports to Mexico, 1985 - 1990

Source: USDAb

Continued investment in Mexican textile manufacturing capacity, either as a relocation from higher labor cost areas or as additional world capacity, will continue to spur Mexican demand for U.S.-produced cotton. A crucial precursor to expanded investment in textile manufacturing capacity in Mexico, however, may well be some reduction in currently perceived risks of foreign direct investment in Mexico (see later section on this topic). The Mexican textile industry was running at about 75% of capacity in 1989, partly as the result of a lack of capital and "a completely unionized labor force" (USDAd).

U.S. imports of Mexican cotton, however, are unlikely to change much in the future because of the restrictive U.S. import quota for cotton. The U.S. imported only 435 mt of cotton during the 1989/90 production year of which about 60% came from Mexico (Taylor).

U.S.-Mexico Agricultural Trade Prospects With an FTA

The recent, abrupt departure of Mexican policy from extreme protectionism dictated by the Mexican economic reform program has already had a significant impact on U.S.-Mexico agricultural trade. Former constraints to building strong linkages between the U.S. and Mexican agricultural sectors have largely been eliminated through the unilateral reduction of tariff and non-tariff barriers by the Mexican government. Indeed, comparatively little remains to be liberalized through a U.S.-Mexico FTA. Consequently, such an agreement could well contribute little additional impetus to U.S.-Mexico agricultural trade growth. In the Mexican point of view, a significant accomplishment of an FTA would be to achieve some reciprocal elimination of U.S. trade barriers.

Two recent world events suggest that free trade in agriculture between the U.S. and Mexico will be quite difficult to achieve. First, agriculture has been the stumbling block to progress in the current round of Multilateral Trade Negotiations both because support for agricultural producers is an emotional issue in nearly all countries and because government intervention in all aspects of agriculture is so pervasive world-wide. The extent and complexity of government involvement in agriculture make the reduction of agricultural trade barriers a difficult process. Non-tariff trade issues such as harmonization of grades and standards, sanitary and phytosanitary concerns, and chemical residues are particularly difficult to negotiate. The extensive set of domestic agricultural policies as well as tariff and non-tariff barriers affecting agricultural trade in the U.S. and Mexico have already become a key point of discord in the U.S.-Mexico talks. Resolving those problems could prove to be the major obstacle to successfully completing an agreement between the two countries.

Second, agricultural issues did not prevent the successful negotiation of a U.S.-Canada FTA primarily because both agricultural trade and trade restrictions between the two countries were low prior to the agreement. The small change in tariff rates required and the contingent nature of some of the agricultural provisions in the U.S.-Canada agreement have resulted in little additional agricultural trade between the two countries since the agreement was implemented. Negotiators in the U.S.-Canada FTA talks could not come to terms with some of the most difficult issues for agricultural trade liberalization between the two countries. In essence, the agreement simply provides that the two countries will continue discussing many of those issues. In the case of the U.S. and Mexico, agricultural trade is large and growing and trade restrictions are significant. Although Mexican tariff rates on many agricultural commodities have already been reduced considerably in recent years, they are still high for a few key commodities. Also, non-tariff barriers to agricultural trade between the U.S. and Mexico appear to be even more pervasive and intractable than those

affecting U.S.-Canada agricultural trade. If the U.S. and Canada, two countries with similar cultures, levels of development, and economic systems, could not come to terms on many difficult agricultural trade issues, it is unlikely that the U.S. and Mexico, with highly distinct cultures, economic systems, and level of development, will be able to resolve all those or similar issues.

Undoubtedly, the U.S. and Mexico will sign some form of agreement which will provide for "freer" trade. The agreement, however, will stop far short of achieving completely free trade between the two countries, particularly for agricultural commodities. There are simply far too many differences in trade policies, practices, programs, and objectives between the two countries at too many levels to be dealt with adequately and successfully in the current negotiations.

The key question, then, is how free will free trade in agricultural commodities likely be between the two countries? The answer to that question, of course, depends on what the particular provisions of the agreement turn out to be. Three general issues could well determine if any agreement signed will be successful in significantly liberalizing U.S.-Mexico agricultural trade: (1) the treatment of internal price support programs, (2) the extent to which the agreement focuses on non-tariff rather than tariff barriers, and (3) the transition and compensation mechanism included.

Even though reductions in *internal agricultural price support programs* could have significant impacts on agricultural trade between the two countries, it is unlikely that a U.S.-Mexico FTA would include such provisions, particularly for the U.S. Both the U.S. and Mexico operate domestic programs to support agricultural producer prices which alter market signals to producers and consumers in both countries and, therefore, affect the volume, value, and composition of trade between the two countries. Truly free trade would require the elimination of all such programs, a politically and socially difficult move for either country to make. Reductions in internal farm price supports have been the main stumbling block in the current GATT negotiations. The U.S., in particular, would not likely consider reducing farm price supports simply for the sake of expanding agricultural trade with Mexico. The U.S. will want to reserve discussion of any such reductions for the GATT negotiations with a larger group of countries. Mexico, however, may be unwilling to agree to eliminate its price supports for corn, for example, through the import licensing system without some similar concession from the U.S. on reduction in implicit export subsidies from the target price, market loan, and other U.S. agricultural producer policies.

Also, even if the agreement calls for a significant reduction in tariff barriers to trade between the two countries, U.S.-Mexico agricultural trade may still not expand significantly unless the

extensive non-tariff barriers affecting that trade are also eliminated. Given the extensive nature of these less obvious but often more restrictive barriers between the two countries and that Mexican tariff barriers have already been reduced considerably for many commodities, simply eliminating the remaining tariffs may do relatively little to boost U.S.-Mexico agricultural trade. The willingness and ability of negotiators to agree on significant and meaningful reductions in non-tariff barriers may well determine whether or not the negotiations are successful in expanding U.S.-Mexico agricultural trade.

Finally, the extent to which significantly freer trade between the U.S. and Mexico in agricultural commodities is achieved depends on the nature of the *transition and compensation mechanism* included in the agreement. Under the U.S.-Canada FTA, fruits and vegetables are allowed a 20-year transition period, compared to 10 years for other products, over which time periods the respective tariffs are to be systematically reduced. Similar provisions for a U.S.-Mexico agreement will also be necessary. Provisions for higher tariffs during peak shipping seasons (seasonal tariffs) to ease the adjustment to import competition may be necessary to minimize perceived losses to U.S. agriculture. "Snapback" tariffs are also allowed under the U.S.-Canada FTA to prevent scheduled tariff reductions during the transition period from imposing excessive adjustment costs on the importing country in any given year under certain conditions such as large price drops or import increases. The snapback provisions of the U.S.-Canada FTA have been implemented infrequently so far.

In the remainder of this section, the likely general effects of a U.S.-Mexico FTA on agriculture and agricultural trade between the two countries are first considered under two scenarios. The first scenario assumes that a U.S.-Mexico FTA eliminates only the remaining **tariff** barriers to trade in agricultural commodities between the two countries. In the second scenario, both **tariff** and **non-tariff** barriers are assumed to be eliminated. Then, the possibility is explored that a U.S.-Mexico FTA may actually un-level the playing field between the two countries rather than level it as is normally assumed to happen when trade barriers are reduced. The remaining part of this section considers the complications of the ongoing GATT negotiations and analyzes the prospects for U.S.-Mexico trade in specific agricultural commodities under an FTA.

Likely General Effects of an FTA on U.S.-Mexico Agricultural Trade

Because the U.S. and Mexico have yet to agree on the specific provisions of an agreement, attempting to analyze the likely effects of a U.S.-Mexico FTA is hazardous at best. Presumably,

however, the final agreement will at least include some reductions in existing tariff and/or non-tariff barriers to trade between the two countries. Because reductions in non-tariff barriers may be difficult to negotiate, the agreement may include primarily provisions to reduce or eliminate explicit tariff barriers to trade. Consequently, the likely general effects of a U.S.-Mexico FTA are analyzed in this section under two scenarios: (1) removal of tariff measures only and (2) removal of both tariff and non-tariff measures. The analysis under each scenario considers the likely changes in trade from the levels that would likely have existed without an FTA as discussed in the previous section.

Scenario I: Removal of Tariff Measures Only

The removal of only tariff barriers would likely have a small to moderate impact on trade in most agricultural commodities between the U.S. and Mexico for three reasons: (1) Mexico has already unilaterally eliminated or significantly reduced most tariffs on agricultural commodity imports, (2) U.S. tariffs on most agricultural commodity imports from Mexico, except fruits and vegetables, are already low or zero, and (3) the most restrictive barriers to agricultural commodity trade between the two countries are non-tariff barriers, including Mexican import licensing regulations, U.S. import quotas, and a divergence between U.S. and Mexican commodity grades and standards, chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and similar regulations.

U.S.-Mexico trade in fruits and vegetables would likely be most affected by an elimination of import tariffs alone. U.S. tariffs on imports of Mexican fruits and vegetables range up to just over 35% on some commodities (refer back to Table 17) and have effectively restricted the flow of those commodities from Mexico. As discussed in the previous section of this report, the value of Mexican horticultural exports to the U.S. have almost doubled in the last 6 years largely as the result of growing demand in the U.S. and seasonal advantages of Mexican producers during certain times of the year. Complete removal of U.S. fruit and vegetable import tariffs would eliminate a major constraint to U.S. imports of those commodities from Mexico and reinforce current growth trends (Table 22). Most likely, a transition and compensation mechanism will be devised to spread out the impact of the tariff reductions on U.S. producers over a period of time, probably 10 to 20 years or more. If snapback provisions are also implemented to prevent sudden changes in market conditions from generating huge surges in U.S. imports, the impact of the FTA in any given year on even the U.S. fruit and vegetable sector is likely to be small.

An elimination of Mexican import tariffs would also likely provide an additional boost to U.S. exports of meats and edible offals, dairy products, and cotton to Mexico (Table 22). Grain exports

Table 22: Likely Effects of Removing Trade Barriers on U.S Agricultural Trade With Mexico^a

Barrier Type	U.S. Exports to Mexico					U.S. Imports from Mexico			
	Dairy	Grains	Cotton	Livestock	Meat	Fruit & Veg.	Fruit & Veg.	Beef	Cotton
Tariff	+	0	+	0	+	+	+	0	0
Non-Tariff									
QR	0	+ ^b	0	0	0	0	0	0	+
IP	-	+/-	-	-	-	0	0	+	0
DR	+	+	+	+	+	+	-	-	-

^a QR = Quantitative restrictions (i.e., import quotas and import licenses).

IP = Internal domestic policies.

DR = Divergence in regulations and standards.

+

 = Likely positive effect (increase from expected trends without an FTA).

-

 = Likely negative effect (decrease from expected trends without an FTA).

^b Primarily corn.

to Mexico would not likely benefit much because tariffs for most of those commodities are already low or zero (refer back to Table 17). Also, U.S. corn, wheat, and barley exports to Mexico are controlled by an import licensing system rather than by tariffs. Mexican live animal import tariffs are also quite low. Consequently, an FTA that only eliminated tariffs would have little impact on U.S. livestock exports to Mexico. By the same token, U.S. imports of cotton, feeder cattle and other livestock, and meats from Mexico would be little affected by removing the low or already eliminated U.S. import tariffs on those commodities.

Scenario II: Removal of Tariff and Non-Tariff Measures

The set of non-tariff barriers affecting agricultural trade between the U.S. and Mexico can be classified into three groups: (1) quantitative import controls (import quotas and licensing), (2) internal producer price supports, and (3) a divergence in commodity grades and standards, chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and similar regulations between the two countries. Elimination of these non-tariff barriers to trade in addition to tariff barriers could well have significant impacts on U.S.-Mexico agricultural commodity trade.

The *quantitative import controls* potentially affecting U.S.-Mexico agricultural trade include primarily U.S. section 22 import quotas on dairy products, sugar, peanuts, and tobacco, the U.S. counter-cyclical beef import quota, the U.S. cotton import quota, and the Mexican import licensing system. Mexico, however, is not a major producer/exporter of the commodities restricted by section 22 import quotas. Consequently, U.S. imports of those commodities would be largely unaffected if Mexico were exempted in some way from their respective U.S. quotas (Table 22). At the same time, the U.S. beef import quota has not been restrictive in recent years and, besides, Mexican exports of beef to the U.S. have also been quite small. Removal of the U.S. cotton import quota, on the other hand, could lead to increased Mexican cotton and fiber exports to the U.S. The other major quantitative control on U.S.-Mexico agricultural trade is the Mexican import licensing system. Although Mexico has already eliminated the import licensing requirement for many commodities, licenses continued to be required for corn, beans, wheat, and several other key commodities. Complete removal of the remaining Mexican import license requirements could significantly boost U.S. agricultural exports to Mexico. At the same time, removal of the import license requirement for these commodities, and for corn in particular, could have far-reaching implications for Mexican agriculture as discussed later in more detail. Consequently, Mexican cotton exports to the U.S. and U.S. corn and wheat exports to Mexico would likely be the major beneficiaries if quantitative barriers affecting U.S.-Mexico agricultural trade were removed.

Both the U.S. and Mexico operate extensive *commodity price support programs* that affect the volume and pattern of agricultural trade between the two countries. As discussed earlier, the U.S. target price/deficiency payment and market loan programs for grains and cotton act as implicit consumption subsidies for both domestic and foreign consumers and encourage greater U.S. exports of those commodities at lower prices than would occur in the absence of the programs. A dismantling of U.S. price support programs would, therefore, reduce U.S. grain and cotton exports to Mexico below levels that would be expected without an FTA (Table 22). The resulting higher market price for feedgrains would also increase the cost of livestock production in the U.S. and restrain the availability of U.S. livestock and meat to Mexican consumers.

An elimination of the Mexican corn guaranteed price implies the elimination of the import licensing requirement for corn which would reduce the corn production incentive to Mexican farmers and lead to a greater demand for corn from the U.S. to fill the gap (Table 22). Nearly all Mexican barriers to beef imports have already been removed. Mexican retail beef prices, however, are still controlled by the government. Removal of the Mexican retail beef price ceiling would negatively impact Mexican consumer demand for beef and encourage some recapitalization of the Mexican cattle

industry. Although such a move would negatively affect U.S. beef exports to Mexico and possibly encourage U.S. beef imports from Mexico, the extent of the impact depends on the Mexican capacity to expand cattle production and feeding operations and the relative efficiencies of the U.S. and Mexican beef packing industries among other things. The government also imposes price controls on many other basic food items such as tortillas, beans, rice, milk, and eggs. These controls help buoy consumption in Mexico so that their removal could have negative implications for some U.S. exports.

Mexican commodity grades and standards, chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and similar regulations are much less stringent than in the United States. The consequence, as perceived from the U.S., is an unfair competitive advantage to Mexico in the production of agricultural products. Harmonizing those standards and regulations and reducing the disparity in their terms and enforcement essentially implies raising Mexican standards to the U.S. level. Assuming that such changes in Mexican standards and regulations could be negotiated (an admittedly heroic assumption) and that an effective means of enforcing compliance by the Mexican agriculture sector could be devised (another heroic assumption), the general impact would be a significant increase in the Mexican cost of production of most commodities, reducing the competitive threat of the Mexican fruit and vegetable and other agricultural sectors and enhancing the export opportunities for most U.S. commodities (Table 22).

In summary, elimination of tariffs alone would likely lead to only small increases in U.S. agricultural exports but lead to rather sizeable U.S. imports of fruits and vegetables in particular (Table 22). If non-tariff are also eliminated, however, the results are much less clear. Removal of domestic price supports in the U.S. would have a negative impact on U.S. exports. Harmonizing U.S. and Mexico commodity standards and regulations, on the other hand, would likely provide a boost to U.S. commodity exports. At the same time, harmonizing the commodity standards and regulations between the two countries could reduce U.S. imports from Mexico and offset the positive impact on those imports from the removal of the tariffs.

Un-Leveling the Playing Field?

Because trade barriers protect and support producers in a country against imports, negotiations to liberalize trade are usually thought of as efforts to eliminate "unfair" trade practices and, thus, "level the playing field" in international trade competition. Nevertheless, trade agreements, such as a U.S.-Mexico FTA, could actually un-level the playing field among signatory countries for particular commodities if selective rather than complete, across the board reductions in trade barriers are made.

In general, a trade agreement may un-level the playing field between two countries for a particular commodity by eliminating a selected class of trade barriers used by one country as a means of offsetting the trade effects of another class of trade barriers used by the other country but left intact by the agreement. Two examples of this potential problem for a U.S.-Mexico FTA involve U.S. imports of fruits and vegetables and U.S. exports of corn.

A U.S.-Mexico FTA that eliminates import tariffs but inadequately addresses the divergence in regulations and standards between the U.S. and Mexico could un-level the playing field between the U.S. and Mexican fruit and vegetable industries. The less stringent and less rigorously enforced Mexican commodity grades and standards, chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and similar regulations essentially reduce the costs of fruit and vegetable production and marketing in Mexico compared to the U.S. Numerous other U.S. regulations relating to business practices also tend to be more restrictive than their Mexican counterparts and add to the competitive disadvantage of U.S. agribusinesses. Such regulations include minimum wage laws, Social Security, workman's compensation, laws relating to migrant and seasonal worker protection, labor housing and field sanitary regulations, occupational safety and health regulations, child labor laws, immigration laws, motor carrier safety laws, hazardous waste disposal regulations, pollution and environmental controls, and similar laws. The consequence of the relatively less stringent Mexican regulations is an incentive to produce fruits and vegetables in Mexico rather than in the U.S. and ship them to U.S. markets. Some U.S. firms have reportedly found it profitable to relocate their operations to Mexico to take advantage of the lax environmental, labor, and safety and health regulations.

Because the costs of complying with U.S. laws and regulations cannot be imposed directly on Mexican producers, U.S. tariffs essentially work to indirectly impose those costs to some extent on that portion of Mexican production shipped to the U.S. Consequently, the U.S. tariffs "level the playing field" on Mexican commodities like fruits and vegetables imported into the U.S. Thus, an agreement that removes only tariff barriers or inadequately addresses non-tariff barriers to trade could be seen as essentially "un-leveling the playing field" for fruits and vegetables imported from Mexico and imposing an "unfair" competitive disadvantage on U.S. producers of those commodities.

In a second example, consider the effects of an agreement that provides for the removal of the Mexican corn import licensing requirement but fails to eliminate or at least exempt Mexico from the effects of the U.S. corn target price and export expansion programs. The Mexican import license requirement for corn effectively restricts corn imports from the U.S. and raises Mexican producer corn prices. The elimination of the import license would be expected to boost U.S. corn exports to

Mexico. At least part of that increase, however, would be the result of the U.S. corn target price/deficiency payment and export enhancement program that support U.S. corn producer prices. Consequently, the Mexican corn import restriction might be seen as a means of offsetting the effects of U.S. corn support price programs on Mexican corn producers to some extent at least. As a result, a U.S.-Mexico FTA that eliminates only the Mexican corn import license requirement with no provisions with respect to U.S. corn price support policies could un-level the playing field in corn in the perspective of Mexico. Certainly, Mexican guaranteed prices for both white and yellow corn are much in excess of U.S. corn target prices so that the policy objective of the Mexican corn import restrictions and the corresponding corn guaranteed prices is not simply to retaliate against U.S. corn policies (Table 23). Nevertheless, the point remains that the Mexican corn import license requirement insulates Mexican producers from the effects of U.S. corn policies and that its removal would subject Mexican corn producers to the "unfair" trade effects of those policies.

The Complications of GATT

The U.S.-Mexico FTA negotiations will likely be heavily influenced by the rules of GATT because both the U.S. and Mexico are contracting GATT members. That is, any U.S.-Mexico FTA must fit within the GATT framework. The U.S. continues to be a leading advocate of organizing world trade under the GATT rules. GATT member countries periodically meet to discuss new rules and procedures for organizing world trade. These meetings and discussions are popularly referred to as "Rounds". The current negotiations, known as the "Uruguay Round," takes the name of the place where the announcement for a new round of GATT negotiations was first made.

The GATT operates under two basic principles: reciprocity and most-favored nation. *Reciprocity* means that a GATT member may lower or eliminate its tariffs only in response to a concession made by another member country. Once a tariff concession is made on a particular item, that item is bound against increase above the agreed upon level (tariff). The *most-favored-nation (MFN) principle* requires that tariff concessions made and bound between two members must be applied to *all* members of the GATT on a non-discriminatory basis. Even though GATT rules have dealt mostly with tariffs, non-tariff barriers to trade have become a matter of heated negotiation among the GATT contracting parties in recent years.

GATT rules are important to the U.S.-Mexico FTA negotiations for several reasons. First, the current round of negotiations focuses primarily on eliminating subsidies to agriculture. The U.S. has pushed for eliminating all agricultural policy restrictions and subsidies affecting international

Table 23: Comparison of Mexican Guaranteed Prices and U.S. Target Price for Corn, 1990/91 - 1992/93

Year	Mexico		U.S. Corn
	White Corn	Yellow Corn	
	----- \$US/bu -----		
1990/91	5.69	4.82	2.75
1991/92	6.04	5.02	2.75
1992/93	6.13	5.11	2.75

Source: USDAC

trade. The European Community (EC), however, has stood firm on reducing rather than eliminating subsidies while the Cairns Group has supported eliminating world agricultural subsidies with certain exemptions for developing countries (Smith). Negotiations broke off in December of 1990 without reaching agreement. Negotiations resumed in 1991 and have focused on a compromise proposal to reduce domestic support, import tariffs, and export subsidies by 30% with some exceptions for developing countries. Also, sanitary and phytosanitary regulations, rules of origin, and similar issues affecting agricultural trade are under discussion. It would have been more efficient from both procedural and substantive perspectives to have negotiated a U.S.-Mexico FTA within the guidelines provided by a GATT agreement. Absent such an agreement, U.S. and Mexican negotiators will have to develop trading rules which later may be inconsistent with those developed under the GATT. Also, the U.S., in particular, will likely avoid discussing reductions of agricultural price supports and subsidies with Mexico until some conclusion to the current GATT negotiations is reached.

The GATT rules also allow the U.S. and Mexico to be the sole beneficiaries of any concessions made to one another. GATT Article XXIV defines an FTA as "a group of two or more customs territories in which the duties and other restrictive regulations of commerce....are eliminated on substantially all the trade between the constituent territories in products originating in such territories." Once this definition is satisfied, bilateral concessions made under a U.S.-Mexico FTA would *not* be subject to the MFN principle. The exclusion of bilateral concessions from MFN treatment might have influenced Mexico's decision to join the GATT prior to initiating FTA discussions with the U.S.

Mexico joined the GATT on August 24, 1986 under Article XXXIII, the "accession" rules and Part IV, the "trade and development" exceptions. These two provisions help explain the implications

of Mexico GATT membership for agricultural trade under an FTA with the U.S. The *accession rule* states that "a government may accede to the General Agreement, and thereby become a contracting party *on terms to be agreed between such government and the contracting parties.*" The terms under which Mexico joined the GATT involved the replacement of the Mexican system of import permits with the more transparent system of "tariffs" recommended under GATT rules. Mexican tariff concessions were significant because Mexico agreed to bind its entire tariff schedule, including industrial and agricultural products, to a maximum tariff level of 50% *ad valorem* from levels of 100%. In addition, Mexico agreed to reduce the tariffs on the majority of its import classification headings to levels of 20% to 50% over a period of 30 months (USITC). These actions represented a "good faith" commitment by Mexico to domestic and international trade liberalization, provided some assurance of lessened discrimination against Mexico's exports, and demonstrated Mexico's interest in playing a more active role in decisions affecting rules for world trade (CRS).

The *trade and development exceptions* to the GATT rules deal with the special concerns of developing countries. Mexico joined the GATT as a "developing country". Thus, under the exceptions, Mexico does not have to match the tariff reductions by the developed countries. Paragraph 8 of the exceptions states that "the developed contracting parties do not expect reciprocity for commitments made by them in trade negotiations to reduce or remove tariffs and other barriers to the trade of less-developed contracting parties." Relying primarily on these exceptions, Mexico agreed to proceed with tariffication of agricultural imports "to the extent compatible with its objectives in the sector" and to continue to apply surtaxes on nine sectors in its development plans (including textiles, footwear, pulp and paper, and foodstuffs) for a period of 8 years. Also, a wide range of imports were targeted for additional changes to meet the objectives of its development plans.

Prospects for U.S.-Mexico Trade in Specific Agricultural Commodities with an FTA

A consideration of only the general effects expected from a U.S.-Mexico FTA obscures some important issues relating to trade in specific commodities. The commodities of particular interest include fruits and vegetables, citrus, grains, livestock and meat, dairy products, and cotton. Unless otherwise indicated, the discussion of the impacts of a U.S.-Mexico FTA on trade in specific commodities assumes that an FTA includes the elimination of all tariff barriers and quantitative restrictions to agricultural trade between the two countries. The U.S., however, is assumed to maintain its price support programs. The agreement is also assumed to have made little progress in harmonizing the widely divergent commodity standards and regulations between the two countries.

Potential Shifts in Competitive Advantage With an FTA

To determine the likely effects of the removal of policy distortions on the pattern of trade between two countries for specific commodities, the respective commodity costs of production of the two countries are often compared in an attempt to discover the underlying pattern of comparative advantage. The major problem with this method of determining the likely basis for trade in the absence of government policy distortions is that, at best, across-country cost of production comparisons for particular commodities provide some notion of *absolute* rather than *comparative* advantage. Even if the cost of production is lower in one country than in another country for a particular commodity (i.e., the first country has an absolute advantage in that commodity), the country with the lower cost of production may still import the commodity from the higher cost country. The principle of comparative advantage asserts that a country will tend to specialize in and export that commodity in which it is *relatively* more efficient in producing. For example, even if Mexico is a lower cost producer of both tomatoes and wheat than the U.S., the Mexican cost of producing tomatoes is likely lower relative to the U.S. cost of tomato production than is the Mexican cost of wheat production relative to that in the U.S. As a result Mexico would tend to produce and export tomatoes and import wheat from the U.S.

Even though comparing costs of production across countries may provide some insight on competitiveness in world trade, such comparisons are hazardous for several other reasons: (1) costs can be distorted by non-trade policies such as production input policies and are directly affected by commodity trade and price policies, (2) converting one country's costs into the currency values of another country ignores any macropolicy distortions inherent in the exchange rate used for the conversion, (3) such comparisons often do not take relative differences in productivity (i.e., output per acre) into account, (4) costs associated with product marketing and distribution also help determine which country will have the advantage in the production and export of a commodity, (5) production cost categories can differ widely among countries, particularly between developed and developing countries, reflecting different levels of technology and cultural practices, and (6) cost comparisons of non-homogeneous agricultural commodities are usually necessary due to physical, quality, or perceived differences in the same commodity from different countries.

Some Insights on Competitiveness from Cost of Production Data

Little data for costs of production are available for most agricultural commodities produced in Mexico. Cost of production data for Mexican horticultural products, however, are collected and

reported by the Mexican National Horticultural Producers' Federation (*Confederación Nacional de Productores de Hortalizas* or CNPH). Some U.S. researchers have spent ten years or more building a database for Mexican horticultural costs of production by commodity using both the CNPH data and survey research in Mexico (see Cook, et.al.). Little else is available for other commodities because SARH (the Mexican Ministry of Agriculture and Water Resources) does not publish such data and little effort has been made by Mexican producer groups, researchers, or other private groups to collect and track such data or at least to make it publicly available.

Cook, et.al. estimate and compare production costs for a broad set of horticultural products in both the U.S. and Mexico. Their data suggest that Mexico has a cost advantage over major U.S. producing regions for some horticultural commodities but a cost disadvantage with respect to others. For other horticultural commodities, Mexico appears to have a cost advantage over some U.S. producing regions but not others. Considering only costs of production (i.e., ignoring transportation costs and duties), the Cook, et.al data indicate that Mexico has a clear advantage over the U.S. in asparagus, fresh strawberries, fresh tomatoes, bell peppers, squash, and cucumbers (Table 24). On the other hand, the U.S. appears to have clearly lower costs of production for eggplant, cantaloupe, apples, and peaches. For other commodities, such as broccoli and tomatoes for processing, some U.S. regions appear to have lower production costs than Mexico while other regions have higher costs.

When the costs of transporting horticultural crops to the border as estimated by Cook, et. al. (whether for imports from Mexico to the U.S. or exports from the U.S. to Mexico) are included in the comparison, the costs of U.S. apples and peaches jumps significantly above those for Mexico. It is not clear from the data, however, whether adequate adjustments were made for differences in product quality. Given such adjustments, Mexican apple and peach production costs might be higher relative to those of the U.S. Also, adding transportation charges pushes Mexican strawberry costs above those of California but not above the fairly high costs in Florida.

Interestingly, when U.S. import duties are added to the costs of horticultural commodities imported from Mexico, cucumbers are the only product for which total costs are pushed above those of its U.S. counterpart. For the other commodities, the U.S. duties either simply reduce the Mexican cost advantage (squash, asparagus, fresh tomatoes, and bell peppers) or increase the U.S. cost advantage (eggplant, broccoli, strawberries, and cantaloupe). Mexican import duties significantly increase the cost of U.S. apples and peaches in Mexican markets.

Table 24: U.S. and Mexico: Selected Per Unit Costs of Producing, Transporting and Marketing Selected Vegetables

Item	Mexico		U.S.	
	Mexicali/San Luis	Imperial Valley, CA	Washington State	
Asparagus:				
Yield (cartons/acre)	120	143	167	
Costs/acre (30 lb carton)				
Pre-harvest	5.86	6.64	7.17	
Harvest, haul, pack & sell	10.39	19.00	6.21	
Transportation	0.40	0.00	N/A	
U.S. duty	5.00	0.00	0.00	
Other fees	21.66	25.65	13.38	
Total cost				
Fresh Broccoli:	Mexicali/San Luis	Imperial Valley, CA	San Joaquin Valley, CA	
Yield (carton/acre)	326	445	450	
Costs/acre (26 lb carton)				
Pre-harvest	3.43	2.77	1.87	
Harvest haul, pack & sell	2.32	3.40	3.37	
Transportation	0.31	0.00	0.00	
U.S. duty	1.00	0.00	0.00	
Total cost	7.06	6.17	5.24	
Fresh Strawberries:	Baja, CA	Santa Maria, CA	Plant City, FL	
Yield (trays/acre)	2,000	2,500	2,993	
Costs/acre (12 lb tray)				
Pre-harvest	2.18	1.98	3.83	
Harvest haul, pack & sell	1.50	2.67	2.67	
Transportation	1.35	0.00	0.60	
U.S. duty	0.10	0.00	0.00	
Total cost	5.13	4.65	7.10	
Tomatoes for processing:	Mexico	Sacramento, CA	Imperial Valley, CA	
Yield (U.S. ton/acre)	21	28	32	
Costs/acre (ton)				
Pre-harvest	37.71	23.54	25.75	
Harvesting	1.67	7.18	17.50	
Others	12.05	17.21	10.28	
Total cost	51.43	47.93	53.53	

continued on next page

**Table 24 (Continued): U.S. and Mexico: Selected Per Unit Costs of Producing,
Transporting and Marketing Selected Vegetables**

Item	Mexico	U.S.
Bell Peppers	Sinaloa	Florida Average
Yield (bushels/acre)	672	1,000
Costs/acre (28 lb bushel)		
Pre-harvest	2.79	4.88
Harvest haul, pack & sell	2.43	3.54
Transportation	1.05	
U.S. duty	0.69	
Total cost	6.96	8.42
Squash	Sinaloa	Dade County, FL
Yield (bu/acre)	200	275
Costs/acre (42 lb bushel)		
Pre-harvest	4.54	4.93
Harvest, haul, pack & sell	3.24	4.57
Freight to border	0.78	0.00
U.S. duty	0.44	0.00
Other fees	0.30	0.00
Total cost	9.30	9.50
Eggplant	Sinaloa	Palm Beach County, FL
Yield (bu/acre)	564	1,700
Costs/acre (42 lb bushel)		
Pre-harvest	3.18	3.13
Harvest, haul, pack & sell	2.74	2.42
Freight to border	0.34	0.00
U.S. duty	0.68	0.00
Other fees	0.30	0.00
Total cost	7.24	5.55
Cucumbers:	Sinaloa	Southwest, FL
Yield (bushel/acre)	552	600
Costs/acre (55 lb bu)		
Pre-harvest	2.99	3.04
Harvest haul, pack & sell	2.52	4.66
Transportation	1.45	
U.S. duty	1.24	
Total cost	8.20	7.70

continued on next page

Table 24 (Continued): U.S. and Mexico: Selected Per Unit Costs of Producing, Transporting and Marketing Selected Vegetables

Item	Mexico	U.S.
	Mexico (medium technology)	Washington State
Fresh Apples:		
Yield (mt/acre)	4.86	18.18
Costs/acre (mt)		181
Pre-harvest	332	310
Harvest haul, pack & sell	243	200
Transportation	8	154
Mexican duty	0.00	845
Total cost	583	
	Chihuahua (Med technology)	California
Fresh Peaches:		
Yield (mt/acre)	4.86	14.55
Costs/acre (mt)		167
Pre-harvest	302	213
Harvest haul, pack & sell	116	200
Transportation	0.00	180
Mexican duty	0.00	760
Total cost	418	

Gomez, Schwentesius, and Merino (GSM) also estimate the production and marketing costs for selected vegetables, and melons produced in both the U.S. and Mexico, including tomatoes, cantaloupe, watermelon, squash, broccoli, cauliflower, onions, bell peppers, and cucumbers using CNPH data (Table 25). In contrast to Cook, et. al., GSM compare production and marketing costs for these commodities after averaging them across various production regions in both countries. GSM total cost estimates for Mexico are significantly lower than those of Cook, et. al. for fresh tomatoes, cantaloupe, and bell peppers and significantly higher for squash, broccoli, and cucumbers.

Although GSM do not specify what is included in their "marketing" costs, their results indicate that Mexican total costs are higher on average across all the selected vegetables and melons except tomatoes and bell peppers than U.S. costs for two reasons: (1) U.S. packing, transportation, and other marketing costs are lower in the U.S. than in Mexico and (2) U.S. yields for those crops are higher in the U.S., significantly reducing the per unit costs as compared to the more widely discussed per acre costs. They conclude that "the advantage that cheap labor in Mexico represents is minimized and lost because of these two aspects." GSM also estimate that harvesting, packing, shipping, and marketing

Table 25: U.S. and Mexico: Average Production and Marketing Costs for Selected Vegetables, 1989/90

		Mexico	US	
	Location	Cost	Location	Cost
		\$US/ton		\$US/ton
Tomatoes Pole	Culiacán (Jan-May)	573.82	Manatee, FL (Sp)	518.09
	Valle Fuerte (Jan-Apr)	410.20	North, FL	531.32
	Autlán (Oct-Dec)	573.82	Southeast, FL	577.62
	Ensenada (Jun-Dec)	361.57	Ruskin, FL (Fall)	629.86
	Average	479.85		564.22
Cantaloupe	Colima (Mar-May)	393.44	California (Sp)	257.64
	Apatzingán (Jan-May)	687.25	California (Fall)	205.91
	Average	308.45		228.78
Watermelon	Obregón (Feb-Mar)	264.21	California (May-Jul)	155.91
	Jalisco (Jan-Apr)	352.69	Florida	157.59
	Average	516.43		156.75
Squash	Guasave (Dec)	486.17	Dade, FL	439.11
	Obregón (Nov-Feb)	546.68		
	Average	516.43		439.11
Broccoli	Celaya (Jul-Feb)	716.26	California (Nov-Mar)	527.26
Cauliflower	Celaya (Jul-Feb)	639.98	California (Dec-Mar)	636.95
Onions	Tamaulipas (Apr)	225.36	California (Mar-May)	220.51
	Jojutla (Nov-Feb)	314.19		
	SLP, So Tamaulipas (Feb-Apr)	430.39		
	Ensenada (Jun-Jul)	218.61		
	Average	297.14		220.51
Bell Peppers	Culiacán (Dec-Apr)	440.59	Palm Beach, FL	695.34
	Ensenada (Aug-Sep)	576.60 ^a	Southeast, FL	749.47
	Average	508.60		722.41
Cucumbers	Culiacán (Jan-Apr)	526.42	Southeast, FL	295.26
AVERAGE		503.72		421.80

^a 1988.

Source: Gomez, Schwentesius, and Merino

account for 64% of the total cost of Mexican vegetables and melons in the U.S. market compared to only 54% for U.S. vegetables and melons (Tables 26 and 27).

As Cook, et. al. point out, "it is difficult to obtain reliable estimates of production costs for citrus in Mexico." They cite the failure of public agencies in Mexico to collect data over the widely dispersed production regions for the wide range of agricultural production systems in Mexico as the principal reason for the lack of citrus production cost data. They provide some sketchy data for orange production costs in Mexico which suggest that U.S. costs are more than 10 times greater (\$2,852.10) than those for orange groves operated by *ejidatarios* in Mexico (\$243.50) and nearly 5 times greater than those for orange groves in private ownership (\$576.00) on a per acre basis. On a cost per unit basis, however, U.S. costs are only 44% higher than those of the Mexican *ejido* groves and 50% higher than those of privately-owned Mexican groves because of the huge differences in yields (650 boxes/acre in the U.S. compared to only 80 boxes/acre and 198 boxes/acre for *ejido* and privately-owned Mexican groves, respectively).

The data provided by Cook, et. al. also indicate that Mexican citrus grove care costs (on a per unit basis) are higher but that harvesting costs are lower in Mexico than in the U.S. The Mexican per unit cost of citrus production is lower than in the U.S. primarily because of free land in the *ejido* sector, subsidized water for irrigation, and cheap labor. Unfortunately, no data is available for Mexican citrus marketing, transportation, and other costs to facilitate a comparison of U.S. and Mexican citrus costs at the U.S. border or internal U.S. points of destination. The more efficient marketing and transportation system in the U.S. likely offsets Mexican production cost advantages to some extent. Another problem with these citrus cost comparisons is that the U.S. costs are for Arizona/California navel oranges, much higher quality oranges that command a premium in the U.S. market than the average Mexican-produced oranges.

Data for Mexican cotton production costs are also sketchy and not highly reliable. Data provided by the U.S. Agricultural Affairs Office in Mexico City indicate that U.S. average cost of production for cotton (U.S. 60.04¢/lb) is higher than that of private (*colono*) cotton farms in Mexico (U.S. 51.18¢/lb) but lower than that of *ejido* cotton farms (U.S. 62.56¢/lb) (Table 28). These comparisons, of course, do not include estimates of marketing, transportation, or other non-production costs and charges or import duties.

Cost of production data for livestock, dairy, and grain operations in Mexico are virtually unavailable for the same reasons that citrus data are unavailable. The apparent Mexican competitive

Table 26: Mexico: Production Costs for Selected Vegetables

	Landrent	Land Preparation	Growing Period	Overhead	Harvest Packing Shipping Marketing	Total
	----- % -----					-----
Cucumber, Tamps.	1.12	3.22	16.15	13.17	66.33	100
Cucumber, Sin.	1.20	1.91	33.25	14.58	49.06	100
Average	1.16	2.56	24.70	13.88	57.69	100
Broccoli, Gto.	3.7	3.5	26.70	8.90	57.20	100
Cauliflower, Gto.	4.1	3.9	26.30	9.40	56.20	100
Squash, Sin.	1.61	2.64	21.40	18.77	55.59	100
Squash, Cd. Obregón	5.66	1.42	14.78	9.64	68.53	100
Squash, Guaymas	6.89	2.33	14.28	2.34	74.16	100
Squash, Huatabampo	2.30	4.60	13.70	7.55	71.85	100
Average	4.12	2.75	16.04	9.58	67.53	100
Watermelon, Cd. Obregón	5.52	1.98	27.43	3.52	61.80	100
Onions, Mor.	4.03	1.76	19.69	0.89	73.63	100
Onions, Mexicali	3.59	3.40	9.72	11.88	71.31	100
Onions, Ensenada	9.57	2.22	16.89	10.55	60.77	100
Onions, Lleras, Tamp.	4.45	0.95	4.45	7.13	82.60	100
Onions, Sur de Tamp.	0.62	1.79	14.34	11.62	71.63	100
Average	4.45	2.02	13.02	8.41	71.99	100
Bush Tomatoes, Guasave	0.61	1.05	15.30	6.14	76.90	100
Pole Tomatoes, Culiacán	0.85	1.06	26.47	12.09	59.22	100
Cantaloupe, Mich.	1.31	4.15	25.16	1.39	67.99	100
Cantaloupe, Col.	2.52	2.06	15.08	1.55	78.79	100
Average	1.92	3.11	20.12	1.47	73.39	100
Bell Peppers, Sin.	0.90	2.15	28.29	12.09	56.56	100
AVERAGE of 10 PRODUCTS	2.73	2.41	22.44	8.51	63.85	100

Source: Gomez, Schwentesius, and Merino

Table 27: U.S.: Production Costs for Selected Vegetables

	Landrent	Land Preparation	Growing Period	Overhead	Harvest Packing Shipping Marketing	Total
	-----		----- % -----		-----	
Cucumber, FL	7.84	1.65 ^a	28.28	3.65	58.76	100
Broccoli, CA	5.7	6.4	22.3	4.1	61.5	100
Cauliflower, CA	5.3	5.8	21.0	3.8	64.0	100
Squash, FL	6.53	3.81 ^a	30.94	4.01	54.7	100
Watermelon, Alachua, FL	3.94	5.35	32.56	3.78	54.37	100
Watermelon, Manatee, FL	7.00	6.26	42.99	8.04	35.71	100
Watermelon, Northern, FL	2.60	5.16	48.05	5.15	39.03	100
Watermelon, Southeast, FL	10.80	5.29	47.68	6.10	30.11	100
Average	6.69	5.52^a	42.82	5.77	39.81	100
Onions, CA	4.61	5.11 ^a	21.15	3.72	65.41	100
Tomatoes, Fall, FL	2.28	5.11 ^a	43.16	4.84	44.67	100
Tomatoes, Sp, FL	2.05	3.86 ^a	36.85	4.11	53.09	100
Cantaloupe, Fall, CA	10.15	9.81	20.39	4.84	54.80	100
Cantaloupe, Sp, CA	10.19	2.87	31.64	5.36	49.93	100
Average	10.17	6.34^a	26.02	5.10	52.37	100
Bell Peppers, Palm Beach, FL	7.73	3.56	44.92	5.39	38.40	100
Bell Peppers, Southeast, FL	3.98	4.62	42.51	4.90	43.99	100
Average	5.86	4.09	43.72	5.15	41.20	100
AVERAGE USA	5.70	4.77	31.62	4.43	53.55	

^a Considered solely as costs for machinery. No other source was obtained.
Source: Gomez, Schwentesius, and Merino

Table 28: U.S. and Mexico: Cotton Costs of Production, 1988/89^a

Table 28: U.S. and Mexico. Cotton Costs of Production, 1967					
Category	Ejidos		Colonos		
	----- \$ US/ha -----				
Mexico					
Soil Preparation	99.28	(8.8%)	99.28	(8.5%)	
Planting	45.61	(4.1%)	45.61	(3.9%)	
Fertilization	56.24	(5.0%)	56.24	(4.8%)	
Labor	57.59	(5.1%)	57.59	(4.9%)	
Water & Drainage	61.71	(5.5%)	61.71	(5.3%)	
Pesticides/Insecticides	173.69	(15.4%)	173.69	(14.9%)	
Harvesting	281.29	(25.0%)	281.29	(24.1%)	
Insurance	180.08	(16.0%)	184.75	(15.8%)	
Interest (48.0%, 52.25%)	170.02	(15.1%)	194.53	(16.7%)	
Social Security			2.86	(0.2%)	
Administration			7.33	(0.6%)	
Taxes			.93	(0.08%)	
Other Fees			.57	(0.05%)	
Total	1,125.51	(100%)	1,166.38	(100%)	
\$ U.S./Acre	455.67		472.22		
¢ U.S./lb	62.56		51.18		
U.S. National Average (¢/lb)			60.04		

^a Converted from Pesos at: US \$1.00 = 2,288.3 Pesos.

Source: SARH (as reported in USDac and corrected by authors)

advantage in feeder cattle production is presumably based on the availability of cheap grazing lands and labor in Mexico. The U.S. competitive advantage in livestock feeding, meat production, and dairy operations, on the other hand, likely comes from access to abundant supplies of relatively low cost U.S. feedgrains and more advanced production and processing technologies. The U.S. advantage in grain production likely results from higher yields and technology and abundant availability of highly fertile soils for crop production with adequate rainfall and/or groundwater for irrigation.

Market Windows and Competitive Advantage in Fruits, Vegetables, and Melons

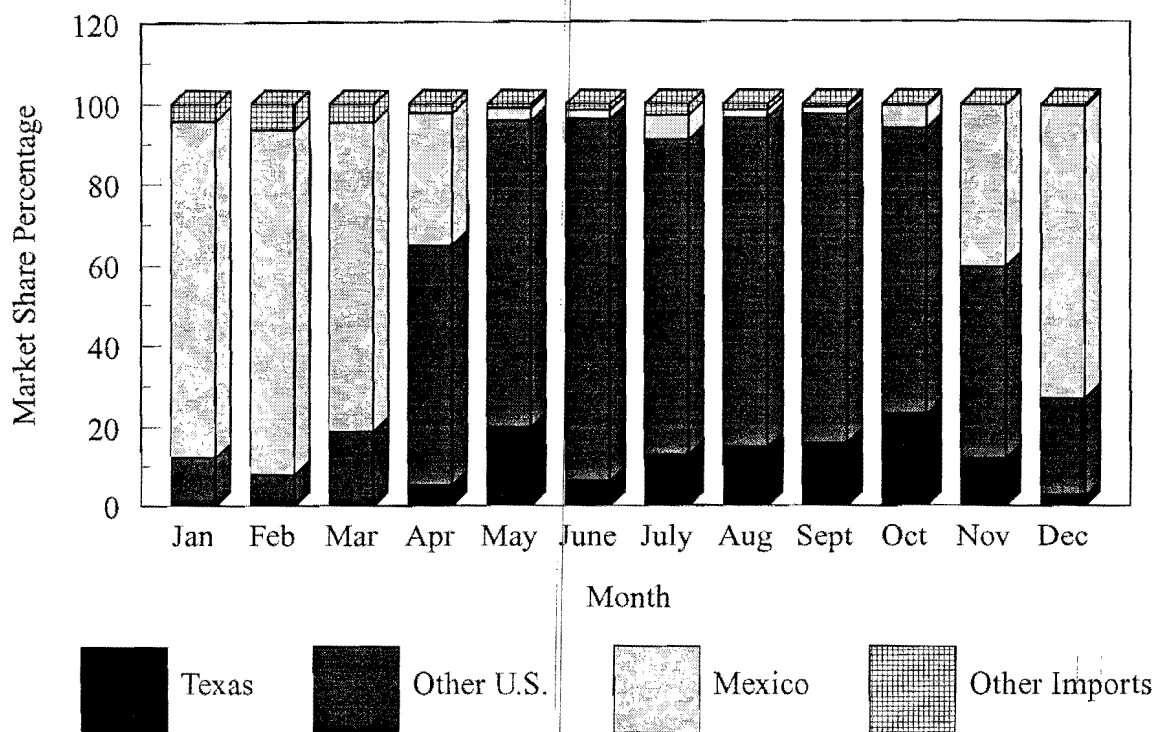
Cost of production may be irrelevant for determining the relative competitiveness of the U.S. and Mexico in the production and trade of specific fruits, vegetables, and melons if U.S. and Mexican production seasons and marketing windows do not coincide. USDA shipment data indicate that both U.S. and Mexican producers ship fresh cucumbers to U.S. markets during the heaviest cucumber marketing months of April-December (Figure 18). The Mexican monthly share of the U.S. cucumber market is largest in April and during the November to December window when the Mexican monthly share ranges from 33% to 75%. In contrast, the Mexican share is relatively small during May through October, when the U.S. market share is large.

Although bell pepper imports from Mexico are received all year, Mexican imports dominate only in January through April and December (Figure 19). Texas is an important bell pepper shipper during the May through June and September through December periods when the Mexican monthly share is generally less than 10%. California is a major shipper generally in competition with Texas in May through October. Florida is a major shipper in December through May in primary competition with Mexican imports. California dominates U.S. fresh broccoli shipments, with monthly market shares in excess of 90%. (Figure 20). Mexico, however, has a small presence in this market and shares the January through April and November through December windows with Texas. Mexico is an important shipper of dry onions in the winter with shipments peaking in the March through April period (Figure 21). Spring onion shipments from Texas coincide with imports from Mexico during March and April. In the remainder of the spring and summer windows, Mexican dry onion imports are small and compete with shipments from Florida. In the melon market, Mexico is generally a significant competitor of U.S. melon producers in May and during the November through December window but hold a small market share in the June through October window (Figures 22, 23, and 24).

Factors Affecting the Impact of a U.S.-Mexico FTA on Competitive Advantage

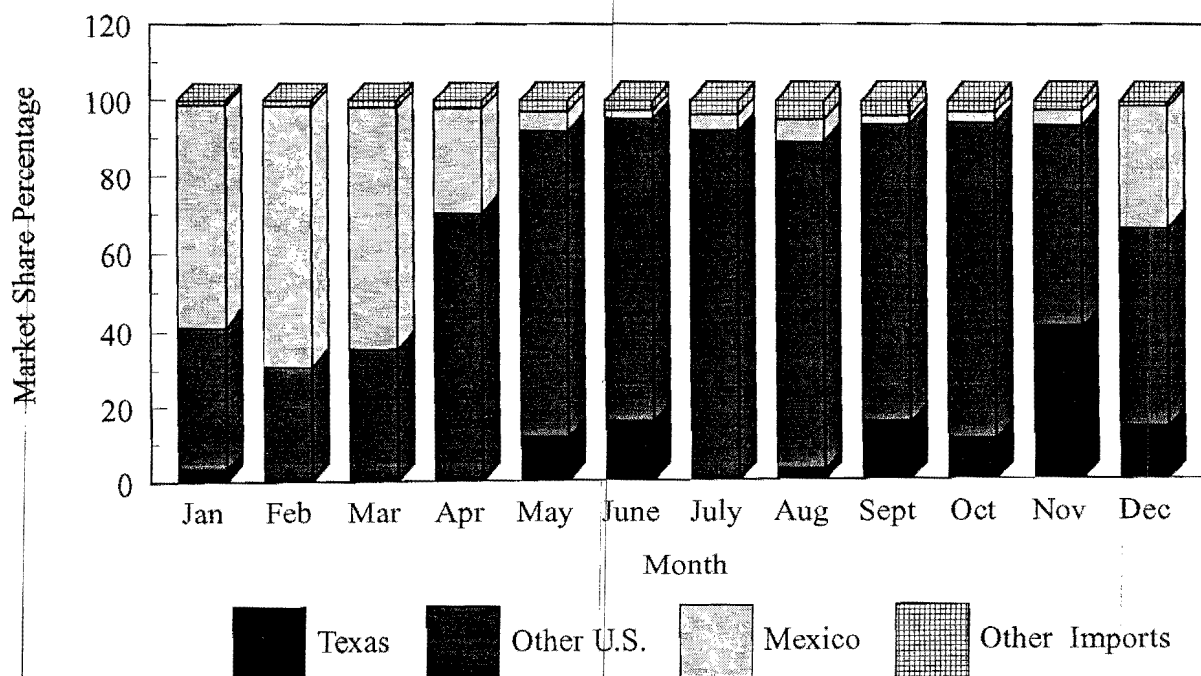
A U.S.-Mexico FTA will likely enhance the existing competitive advantage of some agricultural commodities in both countries but negatively affect the advantage currently enjoyed by others. The extent of the impact of an FTA on the existing pattern of competitive advantage in U.S.-Mexico agricultural trade depends crucially on several factors, including not only the comprehensiveness of the agreement but also the impact of any FTA on economic growth in Mexico,

Figure 18: Market Share Held By U.S., Mexican and Other Suppliers for Cucumbers, 1983-88



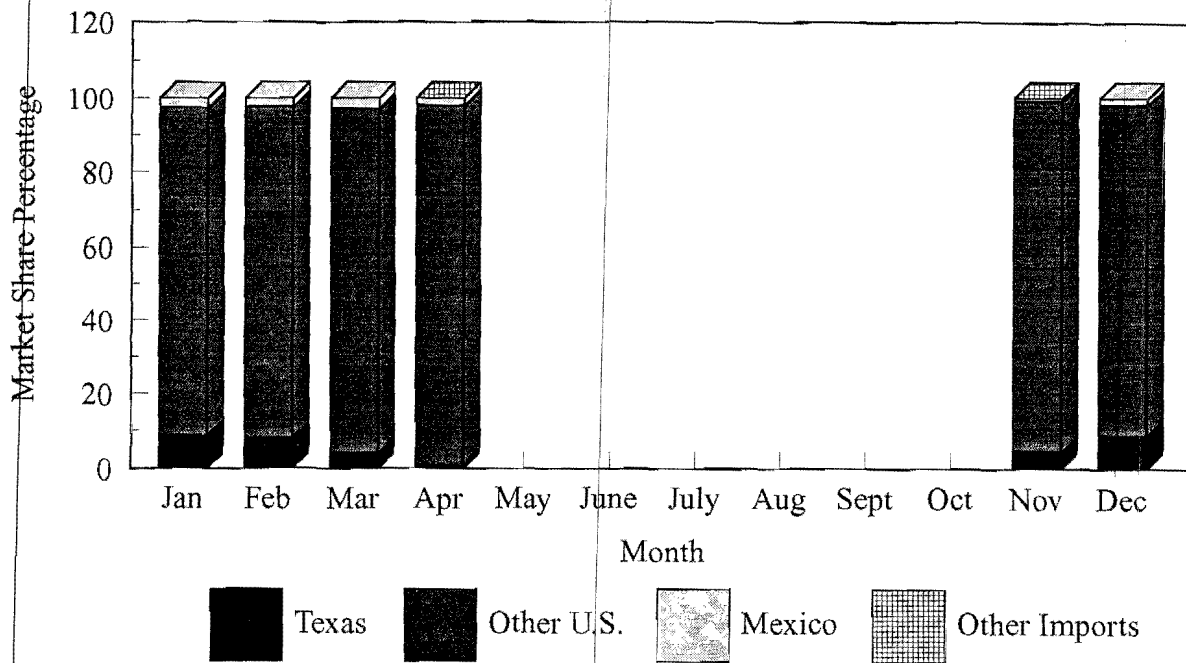
Source: Fuller and Hall

Figure 19: Market Share Held By U.S., Mexican and Other Suppliers for Bell Peppers, 1983-88



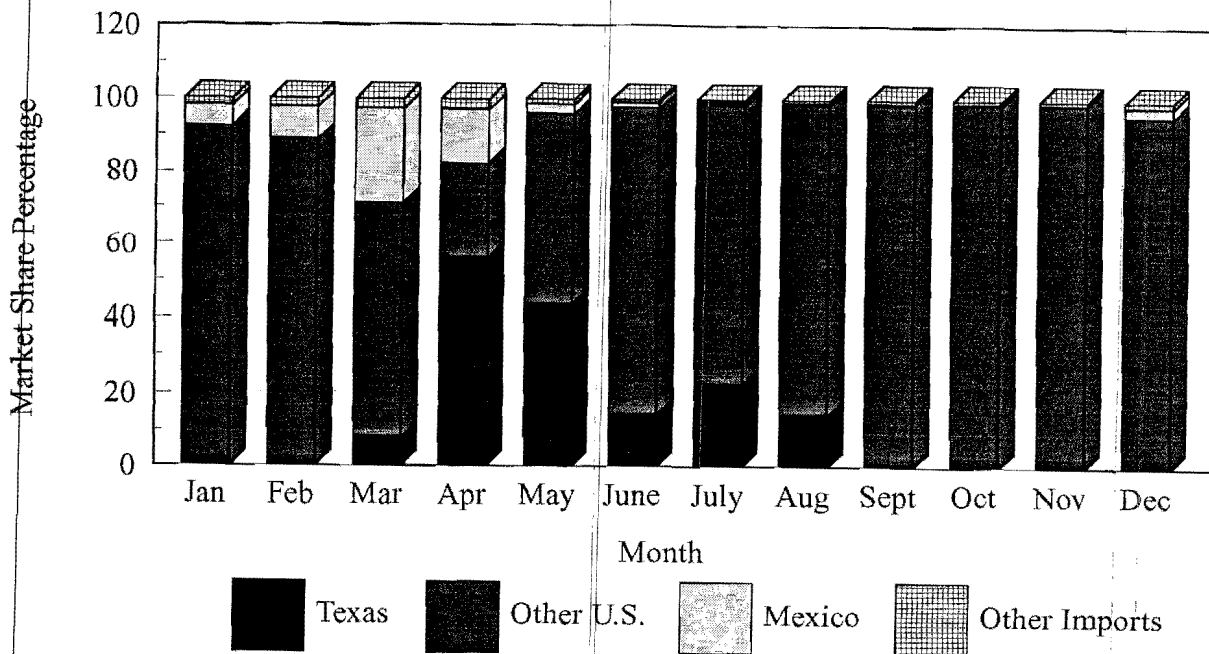
Source: Fuller and Hall

Figure 20: Market Share Held By U.S., Mexican and Other Suppliers for Broccoli, 1983-88



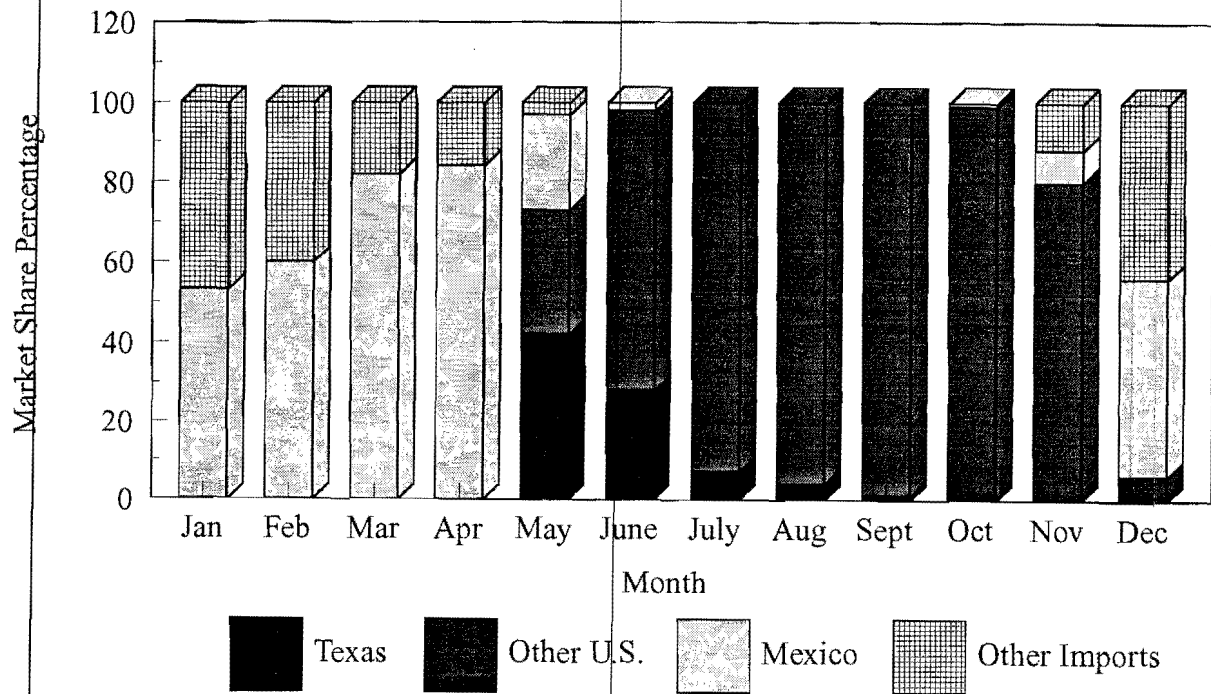
Source: Fuller and Hall

Figure 21: Market Share Held By U.S., Mexican and Other Suppliers for Onions, 1983-88



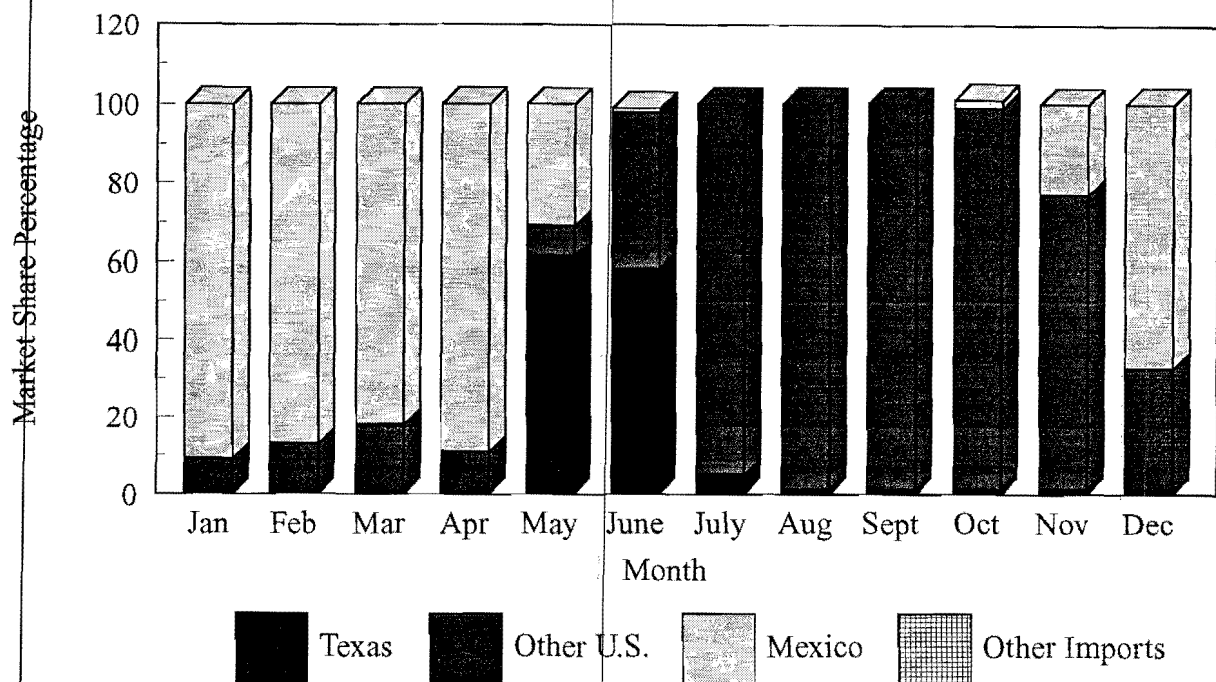
Source: Fuller and Hall

Figure 22: Market Share Held By U.S., Mexican and Other Suppliers for Cantaloupe, 1983-88



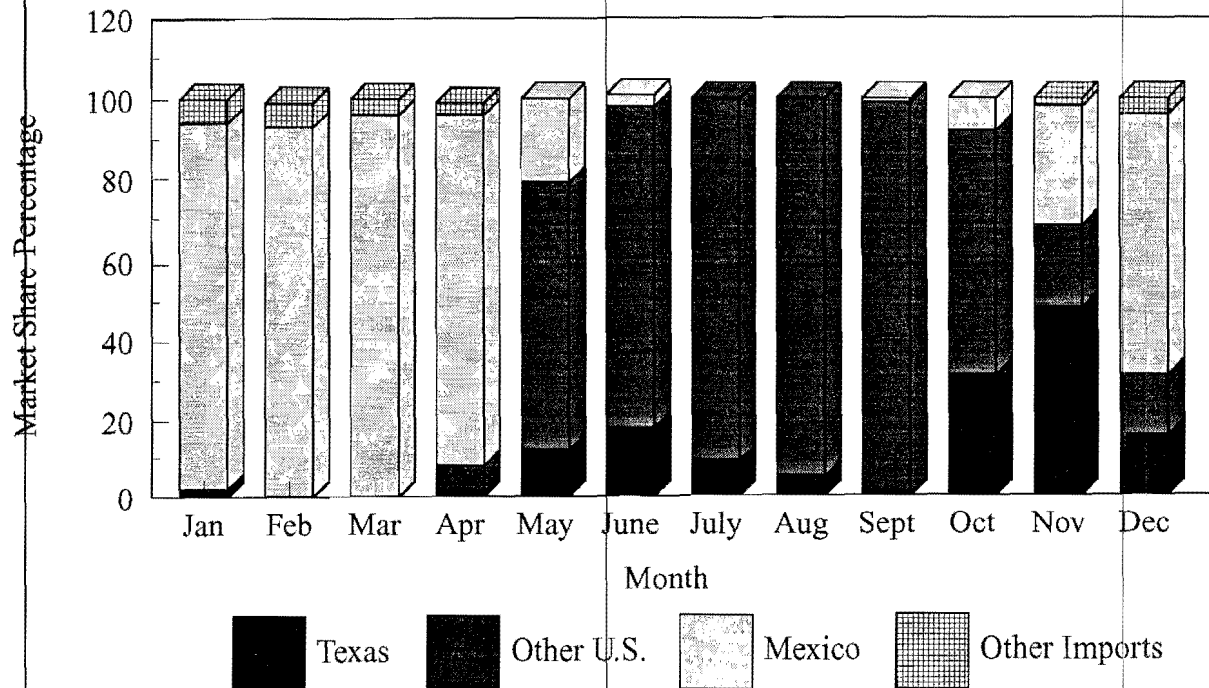
Source: Fuller and Hall

Figure 23: Market Share Held By U.S., Mexican and Other Suppliers for Honeydew, 1983-88



Source: Fuller and Hall

Figure 24: Market Share Held By U.S., Mexican and Other Suppliers for Watermelon, 1983-88



Source: Fuller and Hall

the influx of foreign investment capital, Mexican farm size and structure, labor costs, and the availability of new production inputs in Mexico.

If the *provisions of a U.S.-Mexico FTA* primarily require the elimination of tariff barriers to trade between the two countries and inadequately address non-tariff barriers, the direct consequences for the competitive advantage for either country in agricultural commodity production and trade would be relatively small with the possible exception of some fruits and vegetables as discussed above. The elimination of both U.S. and Mexican fruit and vegetable import tariffs would primarily shift competitive advantage more towards Mexican fruit and vegetable growers with some gains by U.S. growers. If, however, all quantitative import restrictions were eliminated and U.S. and Mexican trucking regulations, commodity grades and standards, chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and other non-tariff barriers were substantially removed or harmonized, a U.S.-Mexico FTA would likely erode some of the competitive advantage (or increase the competitive disadvantage) currently enjoyed by Mexico in the production of many agricultural commodities.

The competitive advantage of the U.S. in the export of many agricultural commodities to Mexico over time will be highly dependent on the *pace of economic development in Mexico*. An FTA that generates a sufficient rate of economic growth in Mexico to sustain long-term growth in Mexican demand for agricultural commodities could provide the basis for adjustments and investments in U.S. agriculture to service the Mexican market. Such growth, however, would likely also stimulate domestic and foreign investment in Mexican agricultural production and processing to meet the growing needs of the domestic Mexican market. Absent significant demand growth, however, the Mexican market will likely continue to be serviced by local suppliers to a large extent with little or no significant increase in capital investments or technology improvements.

Increased availability of *foreign, private capital* will be necessary for Mexican agriculture to fully realize its competitive advantage in the production and export of many agricultural commodities. Without additional investment to lift the current constraints defined by the existing and inadequate capacity, technology, and infrastructure in Mexico, the consequences over the long run could be a slow decline in any agricultural competitive advantage that Mexico may have gained through economic reform and the unilateral liberalization process.

A U.S.-Mexico FTA could also affect the existing pattern of agricultural competitive advantage through its effect on *farm size and structure in Mexican agriculture*. If an FTA provided an incentive for smaller, less efficient Mexican farms to merge into larger, more efficient production units, the resulting efficiencies could bolster Mexican comparative advantage in the production and export of a number of agricultural commodities. Feeder cattle production and similar extensive agricultural production activities in Mexico could experience a relative gain in competitive advantage.

The *low cost of labor* in Mexico is a key factor supporting the competitive advantage of labor-intensive Mexican industries like agriculture. To the extent that a U.S.-Mexico FTA promotes greater U.S. agricultural exports to Mexico and displacement of Mexican agricultural labor in import-competing sectors, Mexican wage rates are likely to fall, at least in the short run, and enhance the competitive advantage of labor-intensive sectors like fruits and vegetables in Mexico. The consequence over the short to intermediate term could be a shift in Mexican agricultural production from more capital-intensive crops like grains to more labor-intensive crops like fruits and vegetables. Over the long run, however, if the FTA fostered sufficient economic growth in Mexico to absorb the displaced labor, wage rates could recover and eliminate the short-run gains from low-cost labor in Mexico. Again, however, the role of an FTA in generating economic growth in Mexico is critical.

An FTA would also likely improve the *availability of critical agricultural inputs* to Mexican farmers, such as new and used farm equipment, spare parts, improved seeds and breeding stock, feeds and additives for animal nutrition, and technical consulting. A more abundant supply of agricultural inputs for Mexican producers should help lower production costs and improve land and labor productivity. Unfortunately, the continuing elimination of government subsidies for irrigation, fertilizer, fuel and lubricants, credit, and technical assistance may limit the availability of many of these critical inputs to all except the larger, commercial farms in Mexico.

Prospects for Fruit and Vegetable Trade With Mexico

The major factors affecting the competitiveness of the U.S. and Mexican horticultural product industries include labor and land costs, technology, water resources, climate, and transportation. Although the United States has higher labor costs than Mexico, it also has greater water resources, a better transportation infrastructure, more fertile land, a more diversified climate providing the capacity to produce and ship a wider assortment of fruits and vegetables than Mexico. U.S. growers and processors also have a technological advantage, although foreign investment in Mexico has narrowed the gap. Consequently, although Mexico appears to have an absolute cost advantage in the production of many labor-intensive vegetable crops, when costs of resources, climate, transportation, and marketing are added, the Mexican advantage may be much less significant as discussed earlier.

In the short run, complete removal of U.S. tariffs under a U.S.-Mexico FTA would likely increase U.S. imports of horticultural products from Mexico above levels that would otherwise be expected, consistent with the apparent pattern of existing competitive advantage. Increased imports from Mexico in the short run would be concentrated in traditionally traded goods and high-dutied products such as asparagus, tomatoes, lettuce, bell peppers, cucumbers, green chilies, squash, avocados, fresh oranges and limes, grapes, guavas, and mangoes. Imports of other Mexican horticultural products, such as broccoli, cauliflower, cantaloupe, eggplant, onions, and okra, might also tend to increase although Mexico is apparently less competitive with the U.S. in these products on a cost of production on a per acre basis (Gomez, et. al. and Cook, et.al). If U.S. demand for Mexican horticultural products is fairly responsive to price changes, U.S. imports of Mexican horticultural products could increase significantly in the short run. As a consequence, U.S. fruit, vegetable, and melon production, prices, and returns to producers could decline significantly. U.S. seed and other input suppliers would also be negatively affected.

At the same time, removal of Mexican tariffs on horticultural product imports would also likely lead to an increase in U.S. horticultural product exports to Mexico in the short run above the levels that might be expected without a U.S.-Mexico FTA but at a moderate rate. Mexican demand for U.S. horticultural products is only moderately price responsive (Fuller and Hall). In addition, the Mexican communication and transportation infrastructure is not sufficiently developed currently to handle significant increases in U.S. exports to major Mexican markets. Consequently, any additional short run growth in U.S. exports to Mexico as a result of an FTA would be concentrated in products that are less perishable, particularly temperate-climate products such as potatoes, apples, pears, peaches, onions, and processed foods such as dried leguminous vegetables and corn. Mexican duties on many of these items appear to be higher than average (15% to 20% *ad valorem*) (USITC).

Over the longer run, the extent, magnitude, and even the direction of horticultural trade flows between the U.S. and Mexico will depend on the success of current Mexican economic policy and a U.S.-Mexico FTA in generating: (1) additional significant inflows of foreign investment capital into Mexico to relieve the major technology, processing capacity, and infrastructure constraints to expansion of the Mexican fruit and vegetable industry and (2) significant overall economic growth and corresponding increases in the real per capita purchasing power of Mexican consumers.

No Growth Scenario and U.S.-Mexico Fruit and Vegetable Trade

Assuming low and insufficient foreign direct investment and economic growth in Mexico over time, reduced U.S. and Mexican fruit and vegetable import tariffs would simply lead to a long-run continuation of the likely short-run increases in U.S.-Mexico trade in fruit and vegetables as constrained by seasonal factors (production seasons and marketing windows) and relative differences in technology, production capacity, infrastructure, etc. In other words, Mexico would continue to be a net exporter of fruits and vegetables to the U.S. over time given the expected continuation of growth in U.S. demand for fruits and vegetables and the limited market opportunities for U.S. horticultural products in Mexico under this scenario.

Although the greater size and diversity of the U.S. industry would somewhat mitigate the impact of growing Mexican imports, the profitability of producing fruits and vegetables in Mexico for export to the U.S. relative to that of alternative crops would likely continue to provide a strong production incentive to the Mexican fruit and vegetable industry. Certain U.S. regions would experience moderate losses in production and employment over time as a result, including California, Florida, Texas, and Arizona, in winter fruits and vegetables. These states produce many of the same

labor-intensive crops as Mexico but at higher labor costs and with more susceptibility to frost damage. Although increased imports of Mexican horticultural products would have to be transshipped through existing border facilities in the short run, shipping directly from Mexican locations to U.S. markets, bypassing transshipment at U.S.-Mexico border locations, would likely become more economically attractive over time. To facilitate direct truck shipments from Mexico to U.S. markets, however, constraints on intercountry motor carrier travel would need to be removed and additional capital invested in the Mexican vegetable marketing infrastructure.

A U.S.-Mexico FTA could also spur growth over the long run under this scenario in U.S. imports of processed Mexican vegetable and fruit products, a sector which has attracted increasing U.S. investment over the last decade. Such processed goods could include canned items, such as fruit and vegetable mixtures, tomato pastes and sauces, and frozen items, such as broccoli, cauliflower, strawberries, and orange juice concentrate. One report expects that large fruit and vegetable processors (particularly freezers), primarily located in California and the Southwest, will likely shift investment to Mexico over time where the same raw product can be harvested and processed at lower costs (USITC). Nevertheless, recent data suggest that U.S. food processing firms investing in Mexico "are more interested in Mexico as a rapidly growing market than as an export platform" (Handy).

Overall, U.S. fruit, vegetable, and melon producers and the associated service industries would tend to lose in this low growth and investment scenario along with Mexican consumers who would pay higher prices for those products as a result of increased Mexican exports. Conversely, Mexican horticultural producers would likely gain from increased prices for expanded exports to the U.S. while consumers in the U.S. would benefit from lower fruit, vegetable, and melon prices.

The timing and the extent of the impact of the removal of the U.S. and Mexican import tariffs, however, would depend on the particular transition and compensation mechanism included in the agreement. The U.S.-Canada FTA provides for the gradual elimination of fruit and vegetable tariffs over 20 years and 10 years for other products. A similar tariff-reduction transition period will likely be included in a U.S.-Mexico FTA. There has been considerable discussion of the possibility of a lengthier transition period in a U.S.-Mexico FTA (up to 30 years) for fruits and vegetables and possibly other agricultural products under the assumption that the agricultural linkages are more extensive and the divergence in the level of development and technology is wider between the U.S. and Mexico than between the U.S. and Canada.

Even though this may be the case, much of the recent expansion in Mexican production of fruits, vegetables, and melons is the result of a southward movement of U.S. operations. In an effort to reduce costs of production, diversify their operations, avoid too frequent freeze damage, and take advantage of seasonal differences in production and marketing opportunities, many U.S. horticultural producers have already moved or expanded their operations into Mexico through joint ventures and contractual arrangements with Mexican producers. Consequently, much of the adjustment and integration that might be considered necessary in the wake of the liberalization of U.S.-Mexico trade is already taking place in response to current economic signals. For this reason, many U.S. horticultural producers, particularly in South Texas, are not entirely opposed to the elimination of U.S. import tariffs. Even if they do not produce fruits and vegetables in Mexico in the off season, some U.S. horticultural producers act as brokers for Mexican fruits and vegetables when the U.S. season ends to ensure that the needs of their U.S. buyers are met all year long. As a result, the actual transition period necessary to avoid large adjustment costs on the horticultural industries of both countries may be much smaller than often assumed. The 20-year transition period allowed for in the U.S.-Canada FTA may be more than adequate for a U.S.-Mexico FTA.

Along with a lengthy transition period, "snapback tariffs" are also being discussed as another mechanism to facilitate the process of adjustment to freer trade by those who may be hurt by more open U.S.-Mexico borders such as U.S. fruit and vegetable producers. Such tariff provisions help prevent excessive market impacts in any given year during the transition period from scheduled tariff reductions by allowing tariffs to "snapback" to former or agreed on levels under certain conditions. These conditions might include market price drops and/or commodity inflows by the importing country in excess of established limits. Such provisions are allowed under the U.S.-Canada FTA but have been implemented infrequently.

Provisions for higher tariffs during peak shipping seasons (i.e., seasonal tariffs) to ease the adjustment to import competition will also likely be included in a U.S.-Mexico FTA. U.S. tariffs for some fruits and vegetables are already higher during the U.S. marketing window (i.e., the post-harvest season) and lower during the Mexican window (Table 29). Increased seasonality of U.S. fruit and vegetable import tariffs is likely to be the focus of some attention in U.S.-Mexico FTA negotiations. In fact, many U.S. horticultural producers, particularly those that have already expanded their operations into Mexico, are in favor of completely eliminating U.S. import tariffs during the Mexican marketing window for specific commodities and increasing or at least maintaining the tariffs during the U.S. marketing window for those commodities in order to clearly define the windows for each country. Because there is substantial, growing overlap in seasons for a number of horticultural crops

Table 29: U.S.: Tariffs on Selected Vegetable/Melon Imports from Mexico, 1990

Commodity	Time of Tariff	Tariff
Cucumbers	12/1 - 2/29	2.2 cents/lb
	3/1 - 6/30	3.0 cents/lb
	7/1 - 8/31	1.5 cents/lb
	9/1 - 11/30	3.0 cents/lb
Dry Onions	year-round	1.75 cents/lb
Bell Peppers	year-round	2.5 cents/lb
Cantaloupe	1/1 - 5/15	free of duty
	5/16 - 7/31	35% ad valorem
	8/1 - 9/15	20% ad valorem
	9/16 - 12/31	35% ad valorem
Honeydew	6/1 - 11/30	35% ad valorem
	12/1 - 5/31	8.5% ad valorem
Watermelon	12/1 - 3/31	free of duty
	4/1 - 11/30	20% ad valorem

Source: USDAh

between the two countries, negotiators in the U.S.-Mexico FTA talks will likely find it difficult to define the respective U.S. and Mexican marketing "windows" to their mutual satisfaction and, therefore, to agree on the appropriate seasonality of U.S. and Mexican import tariffs.

Long-Run Growth Scenario and U.S.-Mexico Fruit and Vegetable Trade

Mexican economic growth as a result of a U.S.-Mexico FTA could generate sufficient growth in real per capita incomes and demand in Mexico over the long run to outpace the ability of the Mexican fruit and vegetable industry to supply the growing markets for fruits and vegetables in both the U.S. and Mexico. With the modest turnaround in Mexican per capita incomes in recent years, increases in domestic fruit and vegetable demand in Mexico may already be cutting into the Mexican export supplies of tomatoes and a few other horticultural products (CORHFES). Under these

conditions, therefore, a U.S.-Mexico FTA could reduce the supply of Mexican fruit and vegetables available for export to the U.S. and even spur Mexican demand for U.S.-produced fruits and vegetables.

At the same time, growth in per capita incomes would reinforce recently growing Mexican demand for food products of perceived or demonstrated higher quality (Cook, et. al.), providing some incentive for consumers to shift from domestically-produced to U.S.-produced fruits and vegetables. Mexican-produced fruits and vegetables sold in the domestic market are often those that cannot meet the quality standards required by U.S. marketing orders for export into U.S. markets. As a consequence, Mexican chain stores and large buyers that demand high quality fruits and vegetables often have difficulty obtaining sufficient supplies of high quality products from domestic producers to meet their needs (Cook, et.al).

If the economic growth resulting from a U.S.-Mexico FTA also stimulated significant public investment in Mexican infrastructure and facilitated increased foreign and domestic investment in Mexican fruit and vegetable production and processing capacity and technology, then the potential and competitiveness of the Mexican the fruit and vegetable industry in supplying the increasing demand in both the U.S. and Mexico could expand significantly, particularly given the currently low level of Mexican compared to U.S. yields for many of those commodities. The result would be increasing competition for the U.S. fruit and vegetable industry in U.S. markets and declining opportunities for U.S. fruit and vegetable exports to Mexico over time. Whether or not Mexico will ultimately dominate both U.S. and Mexican fruit and vegetable markets under this scenario is an empirical question, the answer to which depends on the assumptions made regarding such crucial factors as the long run growth in per capita incomes in Mexico, the income responsiveness of Mexican fruit and vegetable demand, the rate of foreign, public, and private domestic investment in Mexican infrastructure and fruit and vegetable production and processing capacity and technology, the growth rate in U.S. fruit and vegetable markets, and the transferability and adoption rate of new production technology in Mexico to name just a few.

Prospects for Citrus and Citrus Product Trade With Mexico

While the U.S. is the major importer of Mexican citrus, Mexico is not a major market for U.S. citrus and citrus products. Because U.S. tariffs on citrus and citrus product imports are relatively low, a U.S.-Mexico FTA would likely have only a small additional impact on U.S. citrus imports from Mexico above what would already be expected without an FTA. Non-tariff barriers such as phytosanitary regulations to control the spread of insects, particularly the Mexican fruit fly, and

pathogens harmful to citrus and the divergence in grades and standards and food safety regulations, however, will continue to be a major constraint on fresh citrus imports from Mexico into the U.S.

The impacts of a U.S.-Mexico FTA on cross-border investment and production in citrus, however, could prove significant. Given the apparent Mexican cost advantage in citrus production and the competitive nature of production along the border region in particular, a U.S.-Mexico FTA could encourage the Mexican citrus industry to develop along lines similar to major Mexican food processing industries. Mexican exports of processed foods have increased at an annual rate of 20% compared to 5% for fresh products in recent years. Under more liberal trading rules, some major citrus processing facilities could relocate to Mexico from the U.S. to take advantage of lower costs for labor, power, and other inputs. In addition, less restrictive regulations for labor and other input use, combined with no costs for Workmen's Compensation, give Mexico an advantage for increased future processed citrus production and export to the U.S.

For the Mexican fresh citrus industry to make additional serious gains in the U.S. market, harmonization of sanitary and phytosanitary regulations, food safety laws, grades and standards, and other regulations between the U.S. and Mexico will be necessary either through formal agreement or informal adjustments by the Mexican industry. Even if there was no U.S. government response to increasing imports of citrus and citrus products of Mexican origin produced under loose sanitary and phytosanitary and chemical use conditions, U.S. consumers would not likely be highly receptive to such products. Mexican citrus products will need to adhere to U.S. grades and standards as well to compete well at retail in the U.S.

Moderately larger U.S. imports of citrus and citrus products from Mexico induced by a U.S.-Mexico FTA would place some downward pressure on U.S. citrus producer prices and returns. If the U.S. demand for Mexican citrus is price-responsive, as is likely the case, then lowering tariffs would reduce U.S. consumer prices for citrus and citrus products from Mexico. The result would be higher imports and consumption. In the near term, little displacement of U.S. domestic packing and marketing facilities would likely occur. Over the long term, however, U.S. production could decline, particularly in Texas, followed by loss in employment and lower returns associated with citrus production and marketing. Packing and other marketing infrastructure would be pressured to relocate nearer to areas of production in Mexico.

At most, moderate increases in Mexican imports of U.S. citrus could be expected with the elimination of current Mexican import tariffs on citrus even with significant growth in Mexican per capita income and demand for citrus and citrus products. A U.S.-Mexico FTA would likely provide

incentive to expand production onto idle acreage in Mexico, particularly if significant economic growth occurs. As output responded, especially in the northern areas of Mexico, more citrus would be available for export to the U.S. At the same time, limitations in Mexican communication, marketing, and transportation infrastructure, as well as inadequate freezer storage, could provide an incentive for the U.S. to ship more processed citrus products to Mexico instead of more perishable fresh citrus, at least in the near term. If the U.S.-Mexico FTA leads to increased capital investments in Mexican citrus processing facilities, however, the U.S. may gain little in increased processed citrus exports to Mexico.

Potential losers under a U.S.-Mexico FTA appear to be U.S. citrus producers and related input and marketing services located in or near current production areas. While there is some doubt whether or not these industries would face major adjustment because of more open trade with Mexico, it does appear that at least moderate impacts would force some adjustment. Mexican citrus producers would gain due to higher prices and returns, along with reduced risk associated with a more diversified and stable market outlet. This also could be expected to result in greater output over the long term. U.S. consumers of fresh and processed citrus products could be expected to gain from freer trade with Mexico due to lower prices and a wider selection of processed citrus products. Mexican consumers could expect to pay more for fresh citrus and fresh squeezed juices.

Prospects for Grain Trade With Mexico

Historical trends suggest that Mexico, a major but fairly erratic importer of U.S. feed and food grains, will likely continue to increase imports from the U.S. even if trade restrictions are not further reduced. Although a U.S.-Mexico FTA would likely result in some additional increase in U.S. grain exports to Mexico in absolute terms, the increase would consist mainly of corn and only represent a small share of total U.S. production. Mexico has already eliminated most of its tariff and non-tariff barriers against grain imports except the import licensing requirement for corn. Hence, a U.S.-Mexico FTA would likely have a relatively small impact on total U.S. grain exports and prices over what might be expected anyway. The relatively large share of Mexican corn imports accounted for by the U.S. would likely increase somewhat. If the Mexicans refuse to dismantle the import licensing system for corn, as is quite possible, then a U.S.-Mexico FTA would not likely increase U.S. grain exports to Mexico to any extent over levels that would be expected even without an agreement. During a House Agriculture Committee hearing in early April of 1992, USDA Undersecretary Richard Crowder reportedly said that the U.S. has conceded to Mexico's request that it be permitted to maintain a "long-term tariff" on corn because the issue of opening Mexico's import-sensitive market to more U.S. corn is highly political in Mexico (KRF).

Nevertheless, a U.S.-Mexico FTA could have a significant impact on Mexican imports of coarse grains and wheat from the U.S. if the agreement served as a catalyst to boost the rate of growth of the Mexican economy and, hence, Mexican per capita disposable incomes. Any growth achieved through a U.S.-Mexico FTA would be expected to have a sizeable impact on U.S. feedgrain exports to Mexico for several reasons. First, the responsiveness of Mexican food demand to increases in income is likely fairly high. Food grains like wheat and corn would be expected to account for a significant share of any associated increase in food demand. Second, U.S. exports currently account for a large and increasing share of Mexican grain consumption. A large share of any additional Mexican demand for grains as a result of an FTA-induced increase in Mexican economic growth would likely be filled by imports from the U.S. Finally, a U.S.-Mexico FTA would be expected to reduce the competitiveness of the Mexican grain industry, particularly corn, and increase the dependence of Mexican grain consumers on imports from the U.S.

To the extent that the FTA achieves additional economic growth and, hence, increased U.S. exports of grains to Mexico, the obvious gainers would be U.S. coarse grain and wheat producers. Much of this benefit would likely go to Texas producers of sorghum, wheat, and corn, Midwest corn producers, and High Plains wheat producers. The benefits, however, could be comparatively small given the small size of the Mexican markets for coarse grains and wheat relative to the level of U.S. production. Lower priced U.S. grains moving into Mexico would also benefit Mexican foodgrain processors and the Mexican livestock feeding industry. Nevertheless, because consumer prices of wheat and corn are heavily subsidized and controlled, prices to consumers could well increase substantially if a U.S.-Mexico FTA required or otherwise resulted in an elimination of those subsidies, offsetting the per capita income effects of an FTA to some extent.

The losers from a U.S.-Mexico FTA that boosted Mexican growth rates and income would be U.S. users of coarse grains and wheat (the feeding sector, millers, consumers of grains and products) and Mexican producers. Again, however, the impact on U.S. prices could be small. The price effect on Mexican producers could be significant, however, if the prices they received fell to the level of the incoming U.S. grains. Many higher cost Mexican producers could be forced out of production. This could be a major problem for rural development efforts in Mexico since over 30% of the Mexican labor force is still employed in the farm sector (Hall and Livas-Hernandez). Although some of that labor could likely find a higher return use in the growing Mexican industrial labor force as it develops or in a growing Mexican fruit and vegetable sector, there would be some major adjustment problems in the short run.

In summary, U.S. coarse grain and wheat producers appear to have an advantage over their Mexican counterparts on average. Texas and Midwest producers, in particular, would likely realize small gains at least if a U.S.-Mexico FTA boosted U.S. grain exports. This could be especially true for Texas sorghum and white corn producers since they also have an obvious locational advantage over other U.S. producing areas.

Prospects for Livestock and Meat Trade With Mexico

Livestock trade between the U.S. and Mexico is relatively free of tariff barriers. Even Mexican government input subsidies to producers have been largely eliminated. Consequently, elimination of the already low Mexican export tax and the low U.S. import tariff on feeder cattle would most likely result in only a modest boost in feeder cattle exports from Mexico to the U.S. over what would be expected anyway without an FTA between the two countries. As is the case for grains, the major effect of a U.S.-Mexico FTA on U.S.-Mexico livestock and meat trade would come through the impact that such an agreement might have on economic growth in Mexico. Any FTA-induced, long-term economic growth achieved would boost Mexican demand for meat and provide a growing incentive for additional U.S. meat exports to Mexico. At the same time, however, increased Mexican meat demand could lead to the diversion of Mexican feeder cattle currently exported to the U.S. into domestic meat markets and even stimulate growth in the Mexican cattle industry to meet the growing demand. The final outcome will depend on the rate of economic growth and the associated growth in domestic meat demand achieved in Mexico and the way in which Mexican cattle producers respond to the current decapitalization in the industry.

Little or no economic growth or additional investment in the Mexican cattle industry as a result of a U.S.-Mexico FTA would likely lead to continued U.S. imports of Mexican feeder cattle. Cattle feeders throughout the southwestern U.S. would continue to benefit from the imports of relatively lower cost feeder cattle. Consumers in the U.S. would benefit from the higher supplies of lower cost fat cattle which would help hold down consumer beef prices. Mexican cow-calf operators would also continue to benefit from higher prices for feeder cattle exported to the U.S. than available in domestic markets. Over time, however, the additional export pressure on Mexican feeder cattle supplies could reduce the supply of Mexican feeder cattle unless sufficient capital becomes available to modernize and expand the Mexican cattle industry. To meet the growing U.S. demand for Mexican feeder cattle, Mexican cattle raisers have tended to export not only feeder steers and cull cows but also a significant percentage of their breeding inventory, sharply reducing the number of replacement heifers available to rebuild cattle herds following the drought-induced herd liquidation of the mid-

1980s Continued exports of replacement cattle would eventually lead to a downsizing of the Mexican cattle industry without extensive capital investments in expansion and modernization.

The Texas and Southwest cow-calf operators that produce feeder cattle will be in direct competition with any additional feeder cattle imports from Mexico. In fact, over two-thirds of all feeder cattle imported from Mexico entered Texas from 1987 to 1990. Over 70% of the total 1.15 million feeder cattle imported from Mexico entered at Texas points of entry in 1990. An FTA-induced increase in feeder cattle imports from Mexico could be expected to have moderately negative impacts on U.S. feeder cattle prices in the near-term. In the intermediate-term, as the Mexican herd is drawn down, prices could rise, making purchases of Mexican feeder cattle by U.S. feeders less attractive. In addition, the development of a high-quality meat market in Mexico could make exporting feeder cattle to the U.S. less attractive.

Over the long-term, a U.S.-Mexico FTA could induce additional capital investment in the Mexican cattle industry to support growth in cattle feeding to supply the growing internal demand for meat, reducing the availability of Mexican feeder cattle for export to the U.S. Such investments could also eventually lead to increasing Mexican exports of fat cattle to the U.S., providing competition for U.S. cattle feeders. One report suggests that investments in meat packing operations in Mexico to meet growing internal meat demand could also eventually lead to growth in Mexican beef exports to the U.S. (USITC 1991). Even without adequate internal meat demand growth, the low cost of labor in Mexico, in combination with access to low cost feed grains and capital from the U.S., could lead to a Mexican cattle feeding and beef packing industry oriented to producing for the grain-fed beef markets in the U.S. and other international markets, such as Japan and South Korea.

The most likely long-run scenario, however, is that the Mexican cattle industry will increasingly specialize in feeder cattle production for export to the U.S. as a result of a U.S.-Mexico FTA for several reasons. First, despite a likely decline in feed costs in Mexico as a result of an FTA, the relative proximity of U.S. cattle feeders to supplies of feed will continue to provide them with a relative advantage over Mexican feeders. The incentive, therefore, will be for Mexico to continue to produce feeder cattle for fattening and slaughter in the U.S.

Second, recent changes in Mexican land tenure laws could provide an incentive to shift to extensive production practice like livestock raising on large tracts of land in Mexico formerly intensively cropped by *ejidatarios*, providing additional incentive to raise feeder cattle in Mexico.

Third, the Mexican transportation, marketing, storage, and distribution infrastructure is severely underdeveloped making access by Mexican feeders to U.S. feedgrain supplies cumbersome and costly. Also, the incentive to move U.S. meat packing operations to Mexico or invest in new facilities for export to the U.S. because of the lower cost of labor in Mexico could be offset to a large extent by the higher costs and difficulty of transporting, marketing, and distributing meat from within Mexico.

Fourth, the U.S. cattle industry is already hampered with excess feeding and packing capacity so that expansion of U.S. slaughter and processed beef supplies to meet increased demand for beef in the U.S. or Mexico would be much more cost efficient than investments in new capacity in Mexico to meet that demand.

Finally, to the extent that the Mexican government continues to maintain price ceilings on beef, the Mexican cattle industry will likely perceive lower returns from investing in feeding and packing facilities in competition with the U.S. feeding and packing industry than in continuing to produce feeder cattle for export to U.S. cattle feeders.

Consequently, U.S. exports of livestock products to Mexico would likely increase moderately in response to a U.S.-Mexico FTA over time at least. Most probably, the major U.S. meat products to see an increase in exports to Mexico in the near-term would be processed meats and edible offal that sell at a discount in the U.S. market. Over time, growth in Mexican demand and investments in cold storage facilities and related infrastructure could foster a shift towards U.S. exports of higher quality and value, fresh and processed grain-fed meat to Mexico.

With the long-run incentive structure in Mexico likely favoring the production of feeder cattle that are later fattened in U.S. feedlots, many of those Mexican feeder cattle could be grass-fattened and slaughtered in Mexico for sale in the domestic market or in the U.S. An increase in Mexican grass-fed beef exports to the U.S., however, would likely have little effect on U.S. beef markets. The major impact would likely be a reduction in U.S. grass-fed beef imports from Australia. Beef imported from Australia generally goes into the processed beef market rather than into the fresh market dominated by U.S. grain-fed beef. Although increased production of grass-fed beef in Mexico might constrain the growth of U.S. beef exports to Mexico over time, it is likely that any increase in the demand for beef in Mexico as the result of significant growth in per capita income would be accompanied by an increase in demand for higher quality foods like grain-fed beef. Consequently, a growth in Mexican grass-fed beef production may have little effect on potential U.S.

beef exports to Mexico over time except, perhaps, to forestall the growth of Australia beef exports to Mexico in response to growth in Mexican beef demand.

Prospects for Dairy Product Trade With Mexico

Because Mexico has already substantially reduced barriers to imports of dairy products, much of the overall impact of an FTA on the dairy industries of each country would depend on how other issues such as producer and consumer subsidies and milk safety regulations are treated as well as how consumer demand for milk is affected. Mexican import tariffs on dairy products still range from 0% to 20% and import permits are required for some products (Schulthies and Schwart). Breeding cattle and bovine semen are allowed into the Mexico duty-free and no import permit is required. All imported milk powder, including NFDM, is duty-free but an import permit is required. The tariff for evaporated milk is 5% and an import permit is required. The tariff for condensed milk is also 5% but no permit is required. A 10% tariff is charged on all fresh dairy products but no permit is required. The tariff is 20% on all other types of dairy products. Permits are required for fresh, founded, and all soft cheeses but not for powdered or grated cheese or cheese curd.

U.S. sales of finished milk products and dairy equipment would likely increase moderately if Mexican import tariffs and licenses were eliminated. Neither the availability of dairy products nor U.S. consumer prices for dairy products would probably be affected to a large extent, however, because most U.S. dairy products exported to Mexico are excess USDA Commodity Credit Corporation (CCC) inventories of NFDM and cheese. In Mexico, consumer prices for dairy products would decrease somewhat as availability increased.

The main impact of a U.S.-Mexico FTA on U.S. dairy exports would be through the food demand expansion effects of any economic growth and increased consumer incomes achieved in Mexico as a result of the FTA. Because per capita milk consumption in Mexico is only about half (56%) of that in the U.S., the demand for dairy products could increase significantly in Mexico with an FTA-induced increase in consumer incomes. The result would be improved markets in Mexico for both Mexican and U.S. dairy products.

Even given an increase in Mexican milk output at an annual rate of 5% (the approximate average annual growth rate over the last 30 years), annual Mexican consumption would far outstrip production if economic growth in Mexico pushed Mexican per capita milk consumption levels up to U.S. levels by the year 2000 (Schulthies and Schwart). Mexico would have to import nearly 25 billion lbs of milk and milk products or about 41% of projected demand. Furthermore, an increase in

Mexican incomes would likely shift the composition of dairy product demand away from low quality basic products such as NFDM and filled cheeses to specialty products like ice cream and fine cheeses.

An increase in Mexican demand for higher quality manufactured dairy products would increase the demand by Mexican processors for larger supplies of standard grade quality milk. The Mexican manufacturing process would need to adjust to accommodate higher quality and different processing characteristics of the larger raw milk supplies. Many small Mexican producers would likely be forced out of business since the quality of their milk is not dependable and their assembly costs (i.e., the costs of getting the milk from the farm to the processor in a usable form) are high relative to those of larger producers. Big raw milk producers on both sides of the border would benefit. Large producers south of the border would probably be the principal suppliers to the Mexican fluid milk market. Dairy farmers in U.S. border states would likely be the main suppliers to Mexican manufacturing markets. Also, milk from U.S. producers would likely be exported to Mexico in the form of finished products. U.S. producers, particularly Texas producers, would likely sell more class I milk (grade A fluid milk) to Texas fluid processors who would export packaged fluid products to Mexico. Even if Mexico does not officially raise milk safety and quality standards, market pressures resulting from an FTA with the U.S. would force Mexican processors to seek larger quantities of higher quality raw milk and to maintain higher finished product standards.

As a result, the short- and intermediate-term gainers from a U.S.-Mexico FTA would include both U.S. and Mexican milk producers and processors. Producers and processors in U.S. border states, especially Texas, would probably capture most of the benefits accruing to the U.S. As Mexican milk production expands, particular beneficiaries should be U.S. suppliers of breeding stock and genetic material, U.S. dairy equipment suppliers, technical consultants, and dairy nutrition specialists. Mexican processors of manufactured products could benefit from increased availability of high quality raw milk from producers on both sides of the border. Mexican consumers would benefit from improved health, safety and product quality standards that the Mexican dairy processors would need to adopt to compete effectively with U.S. imports. Mexican consumers might enjoy an expanded supply of fluid milk and a greater variety of finished dairy products produced in both countries. Investors could benefit from an increased number of joint ventures in Mexico.

Small Mexican producers would likely be the main losers if an FTA induces increased Mexican imports of dairy products from the U.S. Small dairy farmers in Mexico would not be able to compete with the larger farmers because of their higher assembly costs and less dependable product quality. Furthermore, as the need for a standard grade of milk increases, the pricing of raw milk in

Mexico would likely change from the current volume-based system that favors smaller producers to a system based on protein, butterfat, and solid content that favors larger, more modernized producers.

The losers could also include laborers in milk processing facilities as antiquated, labor-intensive plant technology is replaced with modern automated systems. However, the loss to labor from plant modernization may be partially offset as milk output and manufacturing increase. Some Mexican cheese makers are in the process of automating their plants. Although the new technology is much less labor-intensive, otherwise displaced workers are being shifted to added production lines due to overall plant expansion (Schulthies and Schwart).

Prospects for Cotton Trade With Mexico

Complete removal of U.S. tariffs and quotas in combination with the resolution of current phytosanitary constraints could increase U.S. imports of cotton from Mexico. Clearly, this could have an unfavorable effect on domestic producer prices. The possible increase in Mexican cotton imports into the U.S. as a result of a U.S.-Mexico FTA, however, is not likely to amount to a significant percentage of the U.S. cotton supply. If U.S. demand for Mexican cotton is fairly responsive to price changes, imports could increase moderately with the removal of U.S. trade barriers.

Over the long-run, U.S. cotton production could decline modestly with implementation of a U.S.-Mexico FTA as would returns to domestic cotton producers. This would unfavorably affect local input suppliers in cotton producing areas. Free access to the U.S. cotton market would provide an incentive for Mexican farmers to increase cotton acreage. The extent and magnitude of the production increase, however, would depend crucially on the impact of an FTA on the relative profitability of alternative enterprises in Mexico. While the profitability of cotton production may rise, the profitability of other crops, such as fruits and vegetables, may rise even more.

Other factors determining the impact of a U.S.-Mexico FTA on the competitiveness of the Mexican cotton industry include water and other production constraints in Mexico, the ability of Mexico producers to efficiently market their cotton and cotton products to U.S. consumers, the availability of investment capital to expand production capacity and technology and to improve the transportation and marketing infrastructure in Mexico, changes in the dollar/peso exchange rate, and the particular provisions of the free trade agreement.

In general, U.S. cotton producers and the associated service industries could lose as the result of a U.S.-Mexico FTA along with Mexican consumers who would pay higher cotton prices.

Conversely, Mexican cotton producers would likely gain from increased prices for expanded exports to the United States while U.S. cotton consumers would benefit from lower cotton prices.

THE LINKAGES BETWEEN U.S.-MEXICO AGRICULTURAL TRADE AND MEXICAN AGRICULTURE AND AGRIBUSINESS

Agricultural trade between the U.S. and Mexico will likely continue growing with or without a free trade agreement. That growth, however, will occur within the confines of the existing framework of Mexican institutions, infrastructure, and government policy and other relevant aspects of the Mexican economic and political system, particularly those related to agriculture and agribusiness. At the same time, significant adjustments in many of those forces may be dictated by continuing growth in U.S.-Mexico agricultural trade. Some of more salient aspects of Mexican agriculture and agribusiness likely to help characterize future growth in U.S.-Mexico agricultural trade while undergoing change to differing extents as a result of that growth include the following: (1) the Mexican agricultural policy strategy, (2) Mexican farm size and structure, (3) Mexican agricultural labor, (4) Mexican infrastructure, (5) foreign direct investment in Mexican agriculture and agribusiness, (6) Mexican agribusiness strategy, and (7) technological change in Mexican agriculture.

Mexican Agricultural Policy Strategy

Even though Mexican agricultural policy goals have changed little over time, the strategy for achieving those goals has shifted from market intervention and import substitution to encouragement of agricultural sector competitiveness in both domestic and international markets. The Mexican *Programa Nacional de Modernización del Campo, 1990-1994* (the National Program of Rural Modernization or PNMC) outlines the Mexican government strategy to encourage competitiveness in the agricultural sector, eliminate unnecessary regulations impeding the efficient flow of resources, and create an agro-environment to attract domestic and foreign investment.

Although largely a part of an integrated package of Mexican economic reform, some of the recent changes in Mexican agricultural policy are necessary adjustments in the face of rapid growth in U.S.-Mexico agricultural trade induced by unilateral trade liberalization in Mexico and agricultural market signals. The nature, extent, and composition of future U.S.-Mexico agricultural trade will be defined in large part by the success of the Mexican government strategy for the agricultural and agribusiness sector. At the same time, continued growth in agricultural trade between the two

countries will likely force continued evolution of Mexican agricultural policy. After discussing the main features of the general Mexican government strategy for agriculture and their relationship to future growth in U.S.-Mexico agricultural trade, the Mexican strategy for specific sectors of agriculture are addressed.

The General Mexican Government Strategy for Agriculture

The Mexican government plan for agriculture and agribusiness outlines several key strategic targets within Mexico, including: (1) the land tenure system, (2) agricultural inputs, (3) agricultural credit, (4) water resources, (5) domestic and international marketing and prices, (6) agribusiness and rural industries, and (7) the appropriate roles of parastatals and producer associations in agricultural processing and marketing (SARHc).

Mexican Land Tenure Reform

Pressure from growing U.S.-Mexico agricultural trade as the result of unilateral reductions in Mexican trade barriers is forcing adjustments in the Mexican agricultural sector and agricultural policies to eliminate institutionalized inefficiencies created over many decades through the Mexican land tenure system. When the *ejido* system was established in the 1930s, the goal was not economic efficiency necessarily but rather social equity. Land was expropriated from the large land holders (the *hacendados*), subdivided into small plots of 4 ha to 5 ha and redistributed to the large number of landless farmers.

Although originally intended to be a temporary means of dealing with the problem of land tenure in Mexico, the *ejido* system evolved into a rigid "mechanism for permanent state control of the farmers, the *ejidatarios*" (Grennes, et.al.). As a consequence, the *ejido* system has introduced tremendous economic inefficiency into the Mexican agricultural sector in at least three ways. First, the *ejido* system has created a Mexican agriculture sector composed of many extremely small farms. Mexican land laws require that the Mexican government provide at least 4 ha of irrigated land or its equivalent in rainfed land to each landless peasant (Grennes, et.al.). As a consequence, the government has distributed about 95.1 million ha of Mexican land (about 50% of the total Mexican land area) to landless peasants. The national average irrigated and rainfed land area per *ejido* is only about 1.1 ha and 5.5 ha, respectively. Because of their small size, about 70% of the *ejidos* operate at a subsistence level in the sense that they do not generate enough income to support a family. *Ejido* families earn only about 40% of the minimum wage forcing many to seek off-farm employment

(Grennes, et.al.). The consequence is that *ejidos* lack modern technology and are characterized by extremely low output per acre. Most *ejidos* do not have access to tractors (57%) or industrial equipment (90%), 33% lack electricity, over 50% do not have running water, 80% lack paved roads, and 40% use wood as the main fuel source (Morett).

Second, the *ejido* system has forced huge tracts of highly marginal land into agricultural use. Rapid population growth in Mexico has forced the Mexican government to shift huge amounts of land, much of which is unsuited for agricultural production, into the *ejido* system in compliance with the land tenure laws. Only 20% of *ejido* land is irrigated and the majority of forest land belongs to *ejidos* although only 17% are involved in forestry activities. Nevertheless, because of the subsistence nature of the *ejidos*, over 90% of them produce at least some corn and other food crops despite the unsuitability of the soils and/or climate in many areas. Corn is the main crop for 65% of the *ejidos* (Grennes, et.al.). Again, the consequence is a poor average yield performance on a large portion of Mexican farmland for most crops.

Finally, together with the existing agrarian law, the *ejido* system has prevented adequate agricultural production and resource adjustments to changing economic signals. The Mexican land tenure laws have imposed a number of restrictions on the use of *ejido* land in an attempt to prevent the land from again becoming concentrated in the hands of a few large land owners. Among others, the restrictions have included prohibitions on the selling and renting of *ejido* land since the land still legally belongs to the Mexican government, the hiring of paid labor to work on *ejido* land, and the conversion of crop land to pasture. At the same time, the *small property owner provision* of the existing agrarian law restricts the number of hectares that a particular individual can farm (whether an *ejidatario* or private land owner) to 100 ha for irrigated or rainfed farmland, 200 ha for temporal non-irrigated farmland, 400 ha for semi-arid non-irrigated farmland, and 800 ha for forest, mountain, or desert land. For irrigated land dedicated to cotton production, the ownership limit is 150 ha. For land dedicated to the production of tropical fruits and specialty crops such as banana, coffee, sugar cane, henequen, vanilla, cocoa, rubber, and deciduous fruits, the limit is 300 ha per person. Livestock producers are limited to enough land to support 500 animal units (1 animal unit is considered one cow and one calf or the equivalent in other types of livestock). The consequence has been extensive rigidity in resource and output adjustment to market signals in Mexican agriculture particularly because *ejidos* constitute such a large percentage of Mexican agricultural land area. Many of the restrictions are reportedly violated quite routinely in Mexico, limiting but not eliminating the inefficiencies caused by the restrictions (Grennes, et.al.).

Recent changes in the Mexican land tenure system championed by Mexican President Salinas de Gortari are an attempt to begin the process of eliminating the inefficiencies that the system has created and thereby promote growth in the Mexican agricultural sector. The changes mean that Mexican *ejidatarios* will receive the title to the lands they now occupy and will be able to sell or lease their land with some restrictions. Foreign ownership of Mexican land will be allowed. Also, the new law eliminates current penalties for improving marginal lands. Previously, if the crop acreage limits of the small property owner restriction were exceeded by converting pasture to crops, the land was subject to seizure by the government. This particular provision of the law discouraged farmers from improving their lands. Farmers have been reluctant to invest in their land for fear of losing both the land and the improvements.

If effectively implemented, the net impact of recent land reform legislation could be an incentive for more efficient, larger-scale farms in Mexico at the expense of traditional and less efficient *ejidos*. Farm size will likely increase and the total number of farmers will likely decrease since *ejidatarios* will have to option to sell their land. Migration from rural to urban areas will likely increase. The size and number of corporate-owned farms will probably increase as well as the number of legal joint ventures with foreign companies. *Ejidatarios* will be able to legally respond to a decline in the profitability of crop relative to livestock production in Mexico by converting crop acreage to pasture. U.S. investors will be able to legally set up agricultural operations and the more efficient, private Mexican farming operations will be able to legally expand their production in Mexico through buying or renting *ejido* land.

Although the new laws may lead to some consolidation of small land units, the number of hectares a particular individual can own will still be restricted by the small property owner provision of the existing agrarian law. Businesses and corporations will only be able to own the sum of the number of hectares allowed per person under the small property owner definition for each controlling partner or shareholder. Thus, although the recent changes in the land tenure law will remove some of the impediments to the efficient use of land, labor, and water resources in Mexico, domestic and foreign investment in agriculture and the adoption of modern production technology will likely continue to be limited by continuing restrictions and the extent to which the government effectively implements the new laws.

Agricultural Inputs

The Mexican strategy to eliminate inefficiencies in the agricultural sector also includes the elimination of production input subsidies on water, electricity, fertilizer, transportation, crop insurance, and credit as well as balanced feed subsidies to livestock producers. As a consequence, farm production costs have increased substantially over the last two years in Mexico. At the same time, however, the import licensing requirements for most agricultural inputs are being removed to help offset the effects of the elimination of the subsidies. Input subsidies are being phased out along with gradual privatization of the parastatals that have historically provided subsidized inputs to low income farmers, including FERTIMEX (the fertilizer parastatal). Although the government machinery parastatal is also being phased out, the Mexican government is identifying potentially productive areas in Mexico without adequate machinery and assisting producers in those areas to obtain the machinery needed (Comercio Exterior).

The Mexican government has also announced its intention to reduce the production and use of potentially harmful and/or environmentally damaging agricultural chemicals. At the same time, the government is promoting the development and use of disease, pest, and drought-resistant crop varieties. The domestic Mexican seed industry is scheduled for deregulation and trade barriers restricting the importation of improved seed varieties and livestock breeding stock are to be eliminated. Regulations controlling production, marketing, and research are to be reduced. Only necessary phytosanitary regulations are to be maintained.

An historical notion of the role of input subsidies in supporting agricultural can perhaps provide some perspective on the significance and extent of the adjustment in the Mexican agricultural sector that are being forced by the elimination of government agricultural input subsidies. The largest input subsidy has been provided to Mexican crop farmers through making credit available at below market rates (Table 30). For Mexican livestock producers, the largest subsidy has been the subsidy for the use of balanced feed rations (Table 31). Input subsidies to crop farmers have tended to far exceed those provided to livestock producers in Mexico. In the late 1980s, government subsidies for credit, insurance, irrigation, and fertilizer accounted for about 45% of the total value of all subsidies provided to crop farmers and amounted to about 10% of the Gross Domestic Product (GDP) of the Mexican crop sector. In the livestock sector, input subsidies accounted for only 10% of all subsidies received by producers or about 4% of livestock GDP. Consequently, the elimination of input subsidies is likely to impose much larger adjustment costs on the Mexican crop sector than on the Mexican livestock sector.

Table 30: Mexico: Total Subsidies to the Crop Sector by Type of Policy^a

	1982	1983	1984	1985	1986	1987	1988	1989
	----- million \$US -----							
Price Policy	430	-65	1,100	1,779	1,003	1,453	1,022	994
Credit Subsidy	817	476	494	523	422	365	377	176
Insurance Subsidy	171	172	184	172	138	72	96	144
Irrigation Subsidy	243	183	187	239	166	208	235	313
Fertilizer Subsidy	163	207	168	178	186	191	134	128
Exchange Rate Adjustment	554	752	75	105	646	566	12	-30
Total Transfers	2,378	1,725	2,207	2,995	2,563	2,855	1,874	1,723
Total Transfers (w/o Exchange Rate) (1)	1,824	973	2,133	2,890	1,916	2,289	1,863	1,753
Crop Sector GDP (2)	7,428	6,912	9,102	10,199	7,872	8,057	8,422	N/A
Total Transfers as a % of GDP (1)/(2)	24.6%	14.1%	23.4%	28.3%	24.3%	28.4%	22.1%	N/A

^a Includes wheat, corn, sorghum, soybeans, dry beans, sesame seed, and cotton.
Source: Grennes, et. al.

Table 31: Mexico: Total Subsidies to the Livestock Sector by Type of Policy^a

	1982	1983	1984	1985	1986	1987	1988	1989
	----- million \$US -----							
Price Policy	-674	-976	-126	137	-454	-104	874	352
Credit Subsidy	79	96	124	103	52	45	42	10
Balanced Feed Subsidy	133	387	228	-4	59	31	119	12
Fiscal Transfers Subsidy	0	0	0	6	5	5	4	3
Exchange Rate Adjustment	1,060	1,020	107	135	1,157	1,073	21	-50
Total Transfers	598	527	333	377	818	1,049	1,061	326
Total Transfers (w/o Exchange Rate) (1)	-462	-493	226	242	-339	-24	1,040	376
Livestock Sector GDP (2)	3,894	3,585	4,694	4,988	3,248	3,144	3,908	N/A
Total Transfers as a % of GDP (1)/(2)	-11.9%	-13.8%	4.8%	4.9%	-10.4%	-0.8%	26.6%	N/A

^a Includes beef, pork, poultry, eggs, and milk.
Source: Grennes, et. al.

Agricultural Credit

As part of its plan to induce greater efficiency and growth in the agricultural sector, the Mexican government is attempting to improve the availability of credit to farmers with high productive potential (SARHc). Credit for production financing has been a chronic problem in the Mexican agricultural sector, particularly for *ejidatarios*. The National Bank of Rural Credit (BANRURAL) previously provided most of the credit for *ejidatarios* and other small farmers. With credit to producers that repaid previous loans and can demonstrate high productive capabilities. Although credit is more available for farmers meeting the stiffer requirements, interest rates will not be subsidized as heavily as in the past and will be more closely tied to the national cost of money. In the future, however, producers receiving credit from BANRURAL will be directed to private sector sources of capital.

The National Solidarity Program (PRONASOL), a public welfare agency formed by the sale of state-owned industries, is now the main credit provider for low-income farmers with marginal productive capabilities. Producers unable to obtain financing from BANRURAL or other sources may receive credit on a **one-time basis** from PRONASOL (USDAc). Small producers are being encouraged to form credit unions and associations that will gradually replace public credit sources. The private banking system is replacing BANRURAL as the primary source of credit for large commercial farmers. For export-oriented producers, credit for production and marketing will be available from government sources including Nacional Finance (NAFIN), Commercial Development Funds (FIDEC), and the National Export Bank (BANCOMEX).

The net effect of these changes in government credit policies along with the recent reductions in production input subsidies is likely to be even less availability of funding for *ejidatarios* and other small farmers and an incentive for larger scale farming in Mexico, particularly those operations oriented towards exporting to the U.S. Indeed, after one year of obtaining financing through PRONASOL, many *ejidatarios* may have little choice except to take advantage of the new land tenure laws and rent or sell their land if alternative sources of financing cannot be found. Many operators of small and medium-size farms will likely face similar dilemmas. Many of these farmers may stay on their farms as hired labor while others will likely be forced to migrate to urban areas or other agricultural regions, particularly in the north, in search of work. Unfortunately, many *ejidatarios* in marginal agricultural production areas have already found it difficult to rent their land. Without input subsidies and no access to credit, these farmers will have little choice except to abandon their

land. Little is known about the likely extent of adjustments that these changes in agricultural finance laws and the availability may impose on the Mexican agricultural sector.

Water Resources

Both public and private efforts are aimed at improving the availability and efficiency of irrigation resources in water-short areas in Mexico. The Mexican government has announced plans to improve the efficiency of existing irrigation projects using funds obtained by restructuring the user rate system. Water users will be charged a rate based on usage that more closely reflects the actual cost of development and distribution. Metering systems will be installed on farms where water from public irrigation projects are used.

The Mexican government also plans to turn over the operation and management of irrigation systems to the water users gradually. Farmers served by irrigation systems are being encouraged to level their lands to improve irrigation efficiency. The location of new irrigation projects will be determined by the productive capacity of the land served by the project and the ability of potential water users to invest in the project. Foreign investment is being sought to help complete 127 irrigation projects currently under construction. Depletion of aquifers is being more closely monitored and usage is to be adjusted according to depletion. New aquifers are reportedly not being developed unless the resulting depletion will not exceed the regenerative capacity of the aquifer (Comercio Exterior).

Domestic and Foreign Markets

The Mexican government is reducing its role as a major player in agricultural markets to primarily one of a regulatory agency. Some of the major changes the government has already implemented or plans to implement in the agricultural marketing sector include: (1) new anti-trust legislation, (2) increased decentralization of markets, (3) the creation of a commodity exchange, (4) privatization of the transportation system, (5) reduced international trade barriers, and (6) agricultural export promotion.

The recent *anti-trust* legislation will reduce monopolistic power and permit producers and middlemen greater involvement and control in the marketing process. *Decentralization of markets* is being pushed by defining regional processing and marketing zones located near production areas. Currently most of the food in Mexico is processed and marketed in or near the large population

centers. The government is also encouraging the construction of storage and processing facilities in these zones. The development of a Mexican *commodities exchange* would be intended to enhance the flow of market information from producers to consumers in Mexico, reduce risk and uncertainty for Mexican farmers and food processors, and help stabilize Mexican market prices (Comercio Exterior). The Mexican government is moving relatively slowly towards its announced goal to *privatize the transportation system*. More discussion on the transportation system can be found in a later section on Mexican infrastructure.

Harmonization of domestic prices with international prices through gradual *reduction of international trade barriers* is the crux of the Mexican government agricultural pricing strategy for the future. Given the social and political importance of corn, dry beans, and a few other commodities in Mexico, producers of these commodities continue to be protected by such barriers. Although much of this protection will likely be eliminated over time, the protection for corn will probably persist for some time. The Mexican government will continue to encourage exports of agricultural commodities through technical assistance to potential exporters and the provision of credit at favorable rates of interest as mentioned earlier.

Rural and Agribusiness Industries

The Mexican government is limiting the support of the Mexican financial system for plant refurbishing and modernization projects to only those deemed financially viable. The infrastructure necessary to support plant modernization, such as roads and bridges, are also targeted for increased public investment. Agro-industrial enterprise zones are being planned for rural areas close to sources of raw material supplies with access to export markets. The enterprise zones are intended to improve efficiency in food processing and distribution by reducing transportation costs. They are also intended to encourage displaced agricultural labor to remain in rural areas by providing them with alternative local employment opportunities. The development of enterprise zones near production areas are expected to encourage the creation of technical centers to develop improved crop production practices and promote greater involvement of producers in the marketing and processing of their commodities.

Producer Organizations and Parastatals

An integral component of the Mexican agricultural policy likely to have a significant effect on the level and composition of U.S.-Mexico agricultural trade over time is the deregulation and sale

of agricultural parastatals and the organization of producer cooperatives. As the Mexican federal government reduces its role in the agricultural and agribusiness sector, some of the authority and corresponding decision-making responsibility is being turned over to state and local governments. Private producer cooperatives and committees are being formed to assume some of the market organization responsibilities that government parastatals have traditionally performed. The producer organizations are cooperating with state and local governments to help producers secure inputs and provide them with technical and marketing assistance (Comercio Exterior).

Although the role of the Mexican government in agriculture is decreasing, the parastatal CONASUPO through its affiliates, *Programa de Apoyo a la Comercialización Ejidal* (PACE) and Bodegas Rurales del CONASUPO (BORUCONSA), will still play an active role in the procurement and marketing of corn and dry beans in Mexico. PACE is intended to operate as the marketing agent for these two commodities to protect low income *ejidatarios* from price speculation and exploitation by middlemen and monopolies. BORUCONSA, once the exclusive purchasing agent of CONASUPO, will offer its services as an intermediary to producer organizations. BORUCONSA will utilize existing facilities and serve as a distributor of agricultural inputs in rural areas where input markets currently do not exist.

Mexican Government Strategy for Specific Agricultural and Agribusiness Sectors

The Mexican government strategy for the agricultural industry differs markedly from one commodity to the next depending primarily upon whether they are staple (basic) foods, industrial raw product inputs, or high value products. Corn and beans are the primary staple or basic commodities in Mexico. Industrial commodities are primarily raw product inputs for the processing industry and include oilseeds, tobacco, coffee, sugar, cocoa, cotton, and similar products. High-value products are processed products or unprocessed but high value products often seasonal in nature such as horticultural products and livestock and products, including beef, pork, poultry, eggs, and milk.

Basic Commodities

Despite the liberalization and reforms taking place in other agricultural sectors, the Mexican government strategy for basic commodities, particularly corn and dry beans, will continue to be self-sufficiency. In addition to continued involvement in the production, processing and marketing of basic commodities, the government strategy for basic commodities will be to promote the use of intensive agricultural methods and to expand acreage. The intensive production methods being

promoted include the use of improved seeds and fertilizers and more efficient planting, irrigating, and harvesting techniques. The stated intention of the strategy is to require any intensive agricultural methods adopted to conform to government soil and water conservation recommendations and to exclude "environmentally sensitive lands" such as forests and wildlife preserves from cultivation. A system of grades and standards is being developed for basic commodities to encourage quality and corresponding price differentiation (Comercio Exterior).

Industrial Agricultural Commodities

In contrast to basic commodities, the Mexican government policy strategy for industrial products involves a broad restructuring to increase efficiency, enhance the availability of inputs, and assist small producers. Inefficient parastatals tied to the production, processing, and marketing of industrial products are subject to privatization or closure. The role of the government in this sector will be more regulatory than in the past and limited primarily to settling price and quantity disputes.

High Value Products

For high-value products, the Mexican government will continue in its attempt to minimize its control in these markets and to encourage growth and development for export. Horticultural and livestock products are the two most important classes of high value products in Mexico.

Horticultural Products

Perhaps the least government-regulated of Mexican agricultural industries, the horticultural sector is one of the most important agricultural foreign exchange earners for Mexico. Horticultural producers generally have the flexibility to market either domestically or internationally in search of the greatest return. The government, however, indirectly encourages exports of horticultural products by providing producers with market information along with information touting the profitability of exporting horticultural products compared to selling them domestically (USDAC).

Livestock and Products

The government strategy for the domestic livestock and livestock products industry has shifted from protection and intervention in the last few years to encouraging the industry to be more competitive in both domestic and international markets. The government has announced intentions

to phase out price controls on beef and eggs and to make adjustments in the land tenure system that will likely ease restrictions on the profitability of intensive livestock production. The government is providing more technical assistance to help producers improve productivity. Through the joint efforts of the Mexican Ministries of Agriculture, Health and Commerce, and Industrial Development, the Mexican government is implementing a new beef carcass grading system to encourage and possibly even require producers to modernize their operations.

Vertical and horizontal integration are being promoted by encouraging the formation of regional packing and producer cooperatives. Locating packing facilities near production areas lowers overall transportation costs and cuts out some of the middlemen allowing greater profits at each level of the industry and lower prices at the consumer level. Producer cooperatives are being encouraged to provide farmers and ranchers greater access to needed inputs and technical assistance (USDAC). Although this strategy for the livestock industry is intended to help small producers, some suggest that only token assistance is being offered to small producers with the real beneficiaries being the large producers. As the livestock industry grows more competitive, more and more small producers will likely be forced out of the industry (USDAC).

The purpose of the new beef grading system is to facilitate the marketing of high-value marbled steaks at high prices in an attempt to differentiate the top end of the Mexican beef market. The Mexican government believes that the high prices on the top cuts of beef will allow lower prices on the less desirable cuts. Mexican cattlemen would then be able to receive higher returns for grain-fed cattle. This also would increase the incentive for U.S. cattle feeders to ship fed cattle to Mexico for slaughter (USDAC).

The new grading system is to consist of six grades: (1) *High Supreme-only* which applies to carcasses from certified sanitary feedlots and applies to male half-carcasses from cattle 2½ to 3 years old and weighing at least 285 pounds each, (2) *Moderate Supreme* which applies to specialized European and Zebu breeds, including crossbred cattle, fed for at least 30 days, and can include both male and female with half-carcass weight of 253 pounds, (3) *Select* which includes carcasses from specialized beef cattle or dual-purpose breeds of any sex with convex profile and moderately thick muscling, (4) *Good* which applies to specialized or dual-purpose breeds with convex profile and light muscling, (5) *Standard* which applies to specialized or dual-purpose cattle, to include oxen, and (6) *Commercial* which includes all cattle, any age, weight, sex, with concave profile and irregular muscling (USDAC).

The Mexican Ministry of Commerce and Industrial Development (SECOFI) will likely continue operating a program to modernize the Mexican beef marketing system. The program currently provides funds for the construction of modern slaughterhouses close to the main beef producing regions. In 1990, there were five USDA-approved *maquiladora* packing plants operating in Mexico, certified to export chilled beef to the U.S. In February of 1992, 11 plants were certified although not all are currently producing beef for export to the U.S. The approved plants are in the states of Sonora (3), Coahuila (2), Zacatecas (1), Hidalgo (1), Aguascalientes (1), Tabasco (1), Veracruz (1), and Chiapas (1).

The Mexican beef processors association is encouraging joint ventures with U.S.-based packing companies. Such *maquiladora*-type meat plants could utilize lower cost Mexican labor, import U.S. fat cattle for slaughter, and re-export high quality beef to U.S. markets. The Mexican government hopes to eliminate large, outdated slaughter facilities in major cities and many inefficient butcheries scattered around the country and replace them with medium-sized, modern packing facilities which would supply a higher quality beef directly to retail food outlets.

The authority to set milk prices was shifted from the Mexican federal government to state governments in 1990 to allow milk prices to better reflect regional supply and demand situations. The goal of the federal government is eventually to align domestic prices with international prices. The government of Mexico is reducing the size of the milk parastatal (LICONSA) in its overall effort to streamline public administration. However, LICONSA is still purchasing large quantities of non-fat dry milk (NFDM) for sale to lower income families. LICONSA has traditionally subsidized small dairy producers by supplying them breeding stock and genetic material and by purchasing raw milk from them at a guaranteed price.

As a part of the economic restructuring program, LICONSA is selling support facilities that service primarily low-income dairy producers (e.g., genetic centers, animal feed mills, and milk processing plants) to regional and local dairy associations (USDAC). Although dairy production from small producers is expected to decline because of cutbacks by LICONSA, the effects could be offset by the efforts of newly formed cooperatives among small producers. Subsidized inputs such as feeds, technical assistance, and credit are still available to lower income dairy producers.

Mexican Land Use and Farm Size and Structure

More open markets and increased agricultural trade are forcing the evolution of the Mexican agricultural sector away from traditional, subsistence farming towards larger-scale, commercial farming. Commercial farms are more highly mechanized and productive than their subsistence counterparts which use more traditional methods of farming. Commercial farms utilize more capital, certified or improved seed, fertilizers and agricultural chemicals, and better methods of marketing. Commercial farms, most prevalent in northern Mexico, have benefitted from government assistance for investment in infrastructure, credit, and technical assistance. Cotton, wheat, and horticultural crops are the principal crops produced by commercial farms in the northern irrigation districts.

Traditional agriculture farms, in contrast, are concentrated in the Central and Southern areas of the country, are largely dryland farms, make limited use of modern inputs, and operate with a low level of mechanization. Traditional agriculture farms, in general, are *ejidos*, many of which have low quality land and are separated from communication channels with poor access to commercial marketing channels. Increasing competition from imports of low cost foods and feed, primarily from the U.S., and declining farm support by the Mexican government are pressuring workers in traditional farming areas to abandon the farm and seek employment opportunities in urban areas and in the United States. Because the largest proportion of the growing rural worker outmigration in Mexico is from traditional farm areas, there is structural pressure to develop larger, more sophisticated commercial-type farm operations.

Little change in the amount of total land used for agricultural purposes is expected as Mexican agricultural trade intensifies with or without a U.S.-Mexico FTA because most of the arable land in Mexico is already under cultivation. In addition, the supply of land suitable for crop production is limited by scarce water resources. Cropping patterns, however, are likely to be significantly impacted over time. In particular, increasing Mexican imports of feed and food grains is currently pressuring most Mexican farmers to search for alternative crops to produce on their land since a large proportion of all Mexican farms produce at least some corn and other grains. Some of this land may be shifted to fruits and vegetables even though the growth possibilities are currently limited both by lack of irrigated acreage and investment in water collection, irrigation, and drainage facilities and by continuing U.S. import barriers. Increasing U.S. demand for Mexican feeder cattle is likely to create incentives to shift some of the former corn and grain area as well as marginal land currently cropped by *ejidatarios* to pasture for cow-calf operations.

Significant additional progress in agricultural development and structural change in Mexican farming, however, may depend on whether or not a U.S.-Mexico FTA is successfully concluded for two reasons. First, the additional foreign direct investment needed to modernize the Mexican agriculture and food sector and further promote structural change could be difficult to generate without an FTA that creates significant expectations for economic stability and overall economic growth in Mexico.

The second reason that an FTA may be crucial for continuing development and structural change in Mexican agriculture is that some critical agriculture sectors remain protected from imports, including corn and dry beans, even though many Mexican agriculture markets are now more open to trade even without an FTA. The protection of these critical sectors from import competition fosters inefficiency and forestalls the necessary structural adjustments to modernize and strengthen Mexican agriculture. A U.S.-Mexico FTA that required the elimination of the Mexican import license requirement for corn would likely result in a surge in corn imports from the U.S. and put significant downward pressure on Mexican farm prices. Because the import license scheme is the Mexican government policy tool to raise corn producer prices to guaranteed levels as discussed earlier, the elimination of the corn import license requirement implies the elimination of price supports for the huge number of corn producers in Mexico. The result could be massive displacement of agricultural labor, a significant shift in agricultural cropping patterns, and an incentive for the consolidation of many small *ejidos* into larger commercial farming units. Recent changes in both FDI laws regarding foreign ownership and land tenure policies allowing greater freedom to merge, consolidate, and sell *ejido* land should help facilitate the restructuring of Mexican agriculture under the pressure of an FTA within the limits allowed by law.

Finally, an FTA would likely provide additional incentive for farm size growth and structural change in the northern regions of Mexico which produce most of the agricultural commodities likely to experience increased exports to the U.S., such as fruits and vegetables and feeder cattle. An FTA would likely attract additional foreign capital into these regions and promote an influx of domestic resources from import-competing commodity sectors throughout Mexico. The consolidation of small farms into larger units would increase production efficiency, promote increased use of modern agricultural machinery and chemicals, and reduce average costs of production.

Mexican Agricultural Labor

The Mexican agriculture sector employs more than 25% of the Mexican labor force. As is the case in most developing countries, Mexican agricultural labor is characterized by low productivity and wages. In 1988, agricultural labor productivity and wages were 29% and 22% of their respective national averages (Table 32). Many Mexican farmers consume at home much of what they produce, offsetting somewhat the low productivity and wage estimates. The Mexican land tenure system is largely responsible for the disproportionately high percentage of workers and low productivity and wages in agriculture because the system favors small unproductive, labor-intensive farms.

Mexican estimates suggest that, at current rates, labor utilization in Mexican agriculture will decline only moderately over the next decade (Figure 25). The 6 million Mexican agricultural workers in 1990 are expected to shrink 3% by 1995 and 8% by 2000. In contrast, labor concentration in the Mexican industrial sector and the service and retail sectors are expected to increase 24% and 16%, respectively, by the year 2000.

Rural population as a share of total population has already declined from 33.7% in 1980 to an estimated 27.5% in 1990 (Table 33). The Mexican rural population peaked at 24.3 million in 1985 and then declined steadily to 23.6 million in 1990. Mexican officials predict a continued decline to about 22 million by 1995 and 19.6 million by the year 2000 (Table 33). This rural outmigration trend is likely to persist given the declining level of government support for agricultural production in Mexico. The expected outmigration of labor from agriculture may be on the low side, however, if the Mexican land tenure system is restructured as expected and/or the U.S. and Mexico sign an FTA that significantly reduces remaining agricultural trade barriers.

Of particular concern to U.S. agricultural interests is the magnitude of illegal labor migration from Mexico. There were an estimated 2.1 million undocumented workers from Mexico residing in the U.S. in 1986 (Bean). By 1988, that number had declined to 1.1 million. The Immigration and Naturalization Service (INS) apprehensions of undocumented workers reached an all time high of 1.6 million in 1986 and declined to 849,000 in 1989 (Bean). The main concerns of U.S. labor groups, human rights organizations, and politicians is that undocumented Mexican laborers compete for U.S. jobs, are subjected to human rights abuses by employers, put a strain on U.S. social services and welfare, and threaten national sovereignty. On the other hand, U.S. employers claim that undocumented Mexican workers are willing to perform work that U.S. citizens and documented

Table 32: Mexico: Gross Domestic Product, Labor Concentration, Labor Productivity, and Average Wage, 1988

Activity	GDP	Employment ^a	Labor Productivity ^b	Average Wage ^c
	million 1980 pesos	1,000 workers	1980 pesos	pesos/worker
Commercial Restaurants and Hotels	1,257,673	3,209	391,921	4,198,581
Manufacturing	1,055,656	2,427	434,963	8,711,334
Government and Social Services	898,068	6,426	139,755	5,266,078
Financial Services, Insurance, and Real Estate Rental	534,473	489	1,092,992	12,276,636
Agriculture, Forestry, and Fishing	394,358	6,011	65,606	1,035,707
Transportation and Communications	311,927	1,040	299,930	7,473,567
Construction	239,066	1,910	125,165	4,873,049
Minerals and Fossil Fuels	183,965	273	673,865	8,312,406
Electricity	71,210	107	665,514	15,083,362
Total	4,878,784	21,892	222,857	4,642,894

^a Number of persons "economically active" in each sector.

^b Calculated as GDP/employment.

^c Expressed as nominal values.

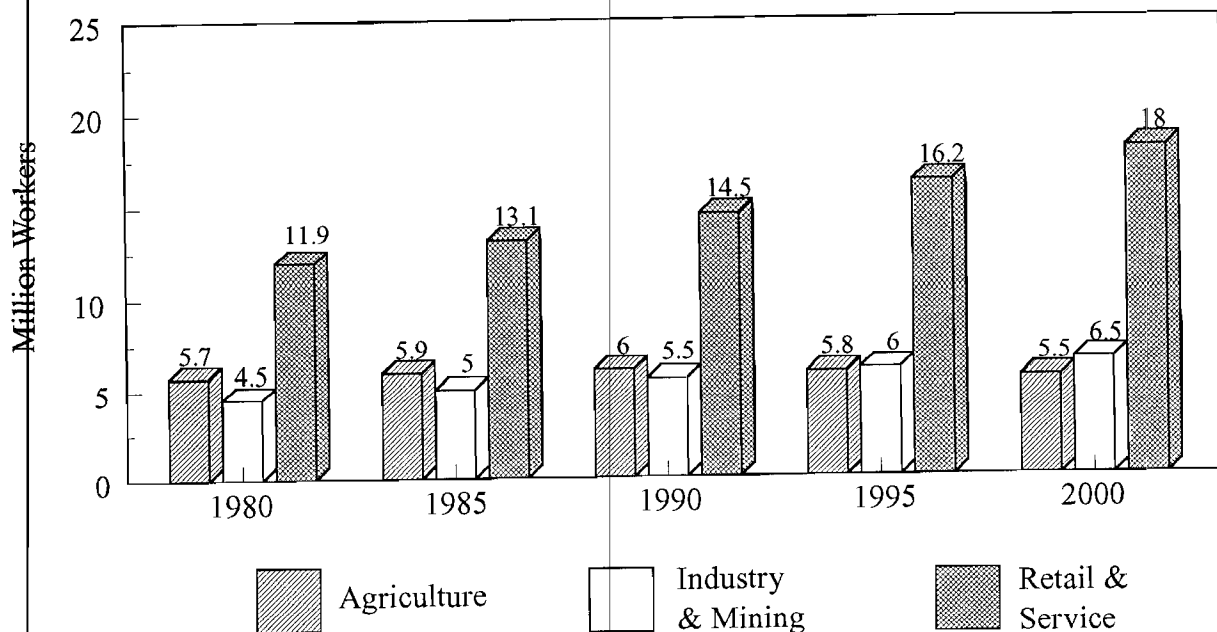
Source: INEGIb

Table 33: Mexico: Urban and Rural Population, 1980-2000

Year	Population		Share of the Total Population		
	Total	Urban	Rural	Urban	Rural
	----- thousands -----		-----	----- % -----	
1980	66,847	44,320	22,527	66.3	33.7
1985	77,938	53,620	24,318	68.8	31.2
1990	85,784	62,190	23,594	72.5	27.5
1995	92,939	70,910	22,029	76.3	23.7
2000	100,039	80,430	19,609	80.4	19.6

Source: NFB

Figure 25: Historical and Predicted Employment by Sector, 1980 - 2000



Source: NFb

Mexican workers are not. Many U.S. farmers, especially fruit and vegetable producers, claim to depend heavily on undocumented workers who accept otherwise unfilled jobs.

The U.S.-Mexico negotiations, however, focus on a relatively narrow "trade and investment only" FTA. Migration, labor, and labor rights issues are excluded from the negotiations presumably because of the general sensitivity to labor issues in both countries. Nevertheless, despite the absence of explicit labor considerations in the U.S.-Mexico FTA negotiations, implicit agricultural labor considerations permeate most, if not all, of the other areas specifically to be addressed by the FTA. The extent of the impact of a U.S.-Mexico FTA on the magnitude, direction, and pace of labor and land use adjustments in Mexican agriculture depend largely on the particular provisions of the agreement and the extent of additional liberalization of U.S.-Mexico agricultural trade that results over what might be expected to occur even without an FTA.

Potential Changes in Mexican Agricultural Labor Use Without an FTA

Given recent reductions in the level of government support for Mexican agriculture, the prospects for continued growth in Mexican agricultural trade will require adjustments in the use and level of labor employed in the Mexican agricultural sector. Increased imports of grains and other commodities from the U.S. and other countries will force Mexican farm labor to find alternative employment within or outside the agricultural sector. Although additional opportunities for employment within agriculture are likely to be found in horticultural and livestock raising operations, the agricultural sector will not likely be able to absorb all the additional labor displaced from farms currently producing commodities that compete with the growing imports (Goodwin).

Much of the displaced labor will likely migrate to already overcrowded urban centers in northern and central Mexico and to the U.S. in search of work. Rumors of work available in Mexico City during the mid-1980s attracted huge numbers of campesinos. As many as an estimated 1,000 people per day arrived in Mexico City from rural areas during 1985 and 1986 even though few new employment opportunities were actually available. The trend was similar in most other large Mexican cities. Many displaced workers eventually migrated to the U.S.

Consequently, increased agricultural trade will likely continue to force Mexican labor use adjustments even without a U.S.-Mexico FTA. Where displaced farmers and agricultural workers relocate, however, will depend on several important factors including growth in productive activities in other agricultural sectors such as fruits and vegetables, growth in other sectors of the Mexican economy, growth in the U.S. economy, and changes in U.S. immigration laws. Increased migration of undocumented workers to the U.S. will increase unless there is significant growth in the non-agricultural sectors in Mexico to absorb the displaced workers.

Potential Changes in Mexican Agricultural Labor Use With an FTA

Perhaps more than for any other area of Mexican agriculture and agribusiness, the implications of an FTA on Mexican labor use and migration depend critically on the particular provisions included in the final agreement. If agriculture is included only superficially, the impact on Mexican agricultural labor use, rural to urban labor migration, Mexico to U.S. labor migration would likely be minimal. On the other hand, a U.S.-Mexico FTA that removed all tariff and non-tariff barriers to trade between the two countries including Mexican agricultural support programs could have potentially enormous consequences for Mexican rural labor use, wages, and migration.

A recent study provides some insight on the potential impacts of a U.S.-Mexico FTA on the Mexican agricultural labor situation under different trade liberalization scenarios (Robinson, et. al.). The study considers numerous trade liberalization scenarios for a U.S.-Mexico FTA, among which are the following: (1) **industrial trade liberalization** in which only *non*-agricultural tariffs and quotas are completely eliminated, (2) **all trade liberalization** in which *all* tariffs and quotas are eliminated (both agricultural and non-agricultural) along with the U.S. subsidization of agricultural exports to Mexico under the Export Enhancement Program, (3) **scenario 2 plus the elimination of all Mexican agricultural support programs**, (4) **scenario 2 plus a Mexican deficiency payment program** so that U.S. and Mexican agricultural support policies for corn and other program crops are the same, and (5) **tariffication plus 10% capital growth plus 50% cut in corn subsidies** in which all Mexican agricultural import quotas are converted to 50% tariffs, Mexican capital stock is increased by 10%, and Mexican agricultural subsidies are reduced by 50%.

The Robinson, et. al. study concludes that removing only non-agricultural tariffs and quotas would have a minimal impact on rural and urban wages in Mexico due primarily to moderate overall gains in Mexican manufacturing sector exports, including processed food exports (Table 34). Little or no displacement of rural or urban labor results under this scenario. The largest displacement of rural labor, primarily to Mexican urban centers rather than to the U.S., occurs with scenario 3 (the elimination of all agricultural and non-agricultural tariffs and quotas, U.S. export subsidization to Mexico, and all Mexican agricultural support policies for corn and other program crops). The large rural to urban agricultural labor migration in this scenario, however, forces an almost equally huge displacement of surplus Mexican urban labor to the U.S. in search of employment.

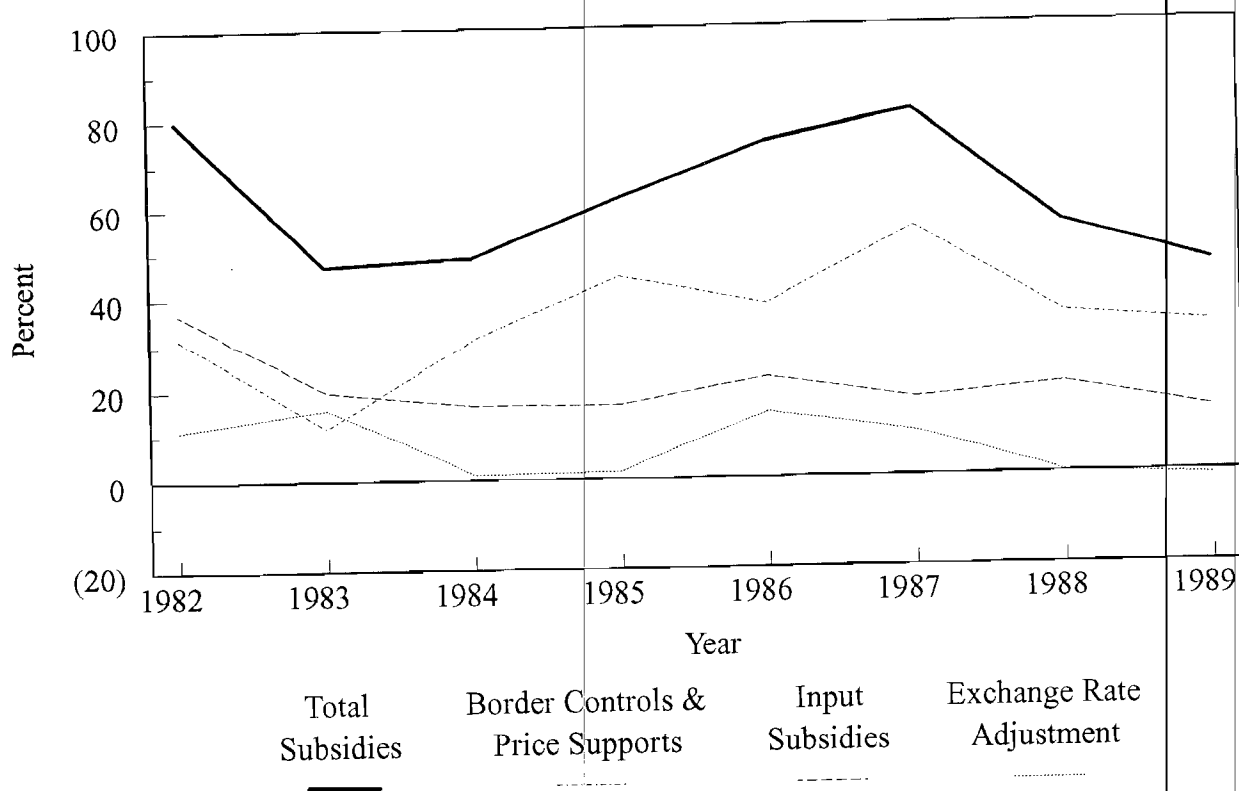
The key to the large labor impact under scenario 3 in the Robinson, et.al. study is the elimination of subsidies for corn in particular. Corn is the most important of Mexican staple crops and currently receives the second highest subsidy of all crops. Only soybeans receive a higher subsidy. The subsidy level for corn averaged almost 64% of the value of Mexican corn production from 1985 through 1989 (Figure 26). Corn occupies the most surface area of any crop in Mexico, representing an average of 35% of the national area harvested between 1985 and 1989, down from the 1980-1984 average of 41%. More than 2 million *ejidatarios* produce corn as their principal crop and over 90% of the *ejidos* produce at least some corn. Corn is the main food for these people and their families. The Mexican government estimated that 38% of corn production in 1984 was consumed on the farm (Hall and Livas-Hernandez). Consequently, reductions in price supports and input subsidies for corn in Mexico together with increased imports of corn from the U.S. would drive many of these producers out of agriculture to urban centers in search of work.

Table 34: Likely Effects of a U.S.-Mexico FTA on Mexican Agriculture Under Alternative Liberalization Scenarios

Scenario	Mexican Wages		Labor Migration			Corn Output	Mexican Exports	
	Rural	Urban	Rural to Urban	Rural to U.S.	Urban to U.S.		Fruit & Veg.	Processed Foods
1. Industrial Trade Liberalization	minimal increase	minimal increase	no change	no change	no change	minimal decrease	minimal increase	large increase
2. All Trade Liberalization	slight increase	slight increase	moderate increase	slight increase	moderate increase	large decrease	moderate increase	moderate increase
3. Scenario 2 plus No Mexican Ag. Support	slight decrease	moderate decrease	large increase	slight increase	large increase	large decrease	large increase	large increase
4. Scenario 2 plus Mexican Deficiency Payment Program	slight increase	slight increase	slight to moderate increase	minimal increase	slight to moderate increase	moderate decrease	moderate increase	large increase
5. Tariffication plus 10% Capital Growth plus 50% Cut in Corn Subsidies	moderate increase	moderate increase	slight increase	no change	no change	moderate decrease	large increase	moderate increase

Source: Robinson, et.al. (Reported results characterized here as "minimal," "slight," "moderate," or "large.")

Figure 26: Mexico: Producer Subsidy Equivalents for Corn, 1982 - 1989



Source: USDAf

The smallest rural labor displacement among the Robinson, et. al. scenarios which include agricultural trade liberalization occurs under the final scenario which assumes that a U.S.-Mexico FTA creates some growth in the Mexican capital stock. Even with a 50% cut in the tariff equivalent of all U.S. and Mexican tariffs and quotas and a 50% cut in Mexican agricultural subsidies for corn and other program crops, only a 10% increase in the Mexican capital stock was required in this scenario to generate sufficient Mexican economic growth to forestall an otherwise devastating drop in demand and employment opportunities in the Mexican agriculture sector. The authors conclude that "this scenario indicates the importance to the success of the FTA for both countries of Mexico achieving more rapid growth."

Unfortunately, the likely effects from the proposed changes in the Mexican *ejido* system were not considered in Robinson, et. al. study. Land tenure reform added to each of the trade liberalization scenarios would likely have intensified the results. Given the choice, many small farmers may opt to sell their *ejido* plots and search for alternative employment. The consequences

would likely include lower rural wage rates and greater rural labor migration to urban centers and to the U.S.

The Robinson, et. al. study also does not consider the time path of the likely changes in labor use and migration. The impacts they report are those that might be expected over the long run after all adjustments induced by a U.S.-Mexico FTA in all sectors have been completed. Because growth in production is limited by biological constraints and installed capacity, infrastructure, and technology, any growth experienced in the export-oriented agricultural and non-agricultural sectors of Mexico is unlikely to be sufficient in the short run to absorb the labor displaced by an FTA that significantly reduces tariff and non-tariff barriers to agricultural trade between the U.S. and Mexico.

For both these reasons, the level of rural-to-urban migration in Mexico and the rural and urban migration to the U.S. could be significantly higher over the short run as a result of a U.S.-Mexico FTA than indicated in the Robinson et. al. study. Over the longer run, if significant economic growth occurs in Mexico and the constraints to growth in Mexican agricultural production are relieved, the rates of rural to urban migration would be expected to decline significantly. If the FTA is not successful in generating sufficient economic growth over the long-run, which is a distinct possibility, the short-run impacts of the agreement could persist over the longer term as well. Also, if the U.S.-Mexico FTA includes a lengthy transition period, Mexican agricultural labor use and migration could be more affected in any given year by the reforms in the land tenure system and a continuation of the overall policy direction of economic reform Mexico has taken in the last five years than from an FTA. This is particularly true if corn is effectively exempted from the trade barrier reductions likely to be required of other agricultural commodities.

Without an FTA, migration from Mexican rural to Mexican urban areas and to the U.S. would likely continue at current levels and may even increase in the near term depending on the development of Mexican crop programs and land tenure policies. Rural to urban migration would likely increase if the Mexican government continues to decrease or eliminate input subsidies and guaranteed prices for staple crops and continues with its plans to liberalize the land tenure system. Some of the displaced agricultural labor in Mexico would likely look northward for employment, increasing the flow of undocumented workers into the U.S. The subsequent increase in the U.S. agricultural labor supply would likely put downward pressure on U.S. agricultural wages.

Potential Effects on Immigration of Undocumented Mexican Workers

From the U.S. perspective, perhaps the main labor issue of a U.S.-Mexico FTA is the likely impact on the flow of undocumented workers entering the U.S. along the border with Mexico. Certainly, many consider liberalizing trade in labor-intensive commodities to be a means of reducing migration of undocumented Mexican labor that is lured to the U.S. by relatively higher wages and job availability and pushed by the high levels of unemployment in Mexico (Thompson and Martin). Consequently, the idea behind a U.S.-Mexico FTA, in this view, is to promote the import of Mexican-produced, labor-intensive commodities instead of Mexican laborers.

A recent study by Thompson and Martin concludes that the ability a U.S.-Mexico FTA to reduce illegal migration from Mexico to the U.S. depends on two related factors. First, the pressure for illegal migration to the U.S. could diminish somewhat if the FTA boosts labor-intensive agricultural commodity production in Mexico. They analyze the case of U.S. tomato imports and conclude that a U.S.-Mexico FTA would increase employment in the main tomato-producing region of Mexico (Sinaloa) by about 4% in season (December through May) with a corresponding elimination of jobs in the Florida tomato industry.

Nevertheless, Thompson and Martin indicate that whether or not illegal migration actually drops as a result will also depend critically on whether the labor recruited from elsewhere in Mexico (i.e., interstate migration in Mexico) to work in northern Mexico (where most of the additional labor-intensive production will likely occur) actually remains in Mexico or migrates to the U.S. after the agricultural production season ends. They point out that much of the production of labor-intensive commodities like fruits and vegetables that are likely to benefit from a U.S.-Mexico FTA are seasonal in nature and occur primarily in northern Mexico. Consequently, the increased production of those commodities will likely be seasonal in nature and will create a seasonal increase in demand for labor in northern Mexico. The concern is that much of the increased number of workers migrating from further south within Mexico to northern Mexico to fill the increased number of jobs in labor-intensive crop production may simply continue migrating northward to the U.S. once the production season is over in late spring to early summer. They conclude that "if expanded production translates into expanded internal recruitment [in Mexico], the absolute number of interstate migrants continuing to migrate illegally to the United State could easily increase. Hence, increased labor use [in Mexico] induced by trade liberalization could lead to increased illegal migration to the United States as interstate migration begets international migration."

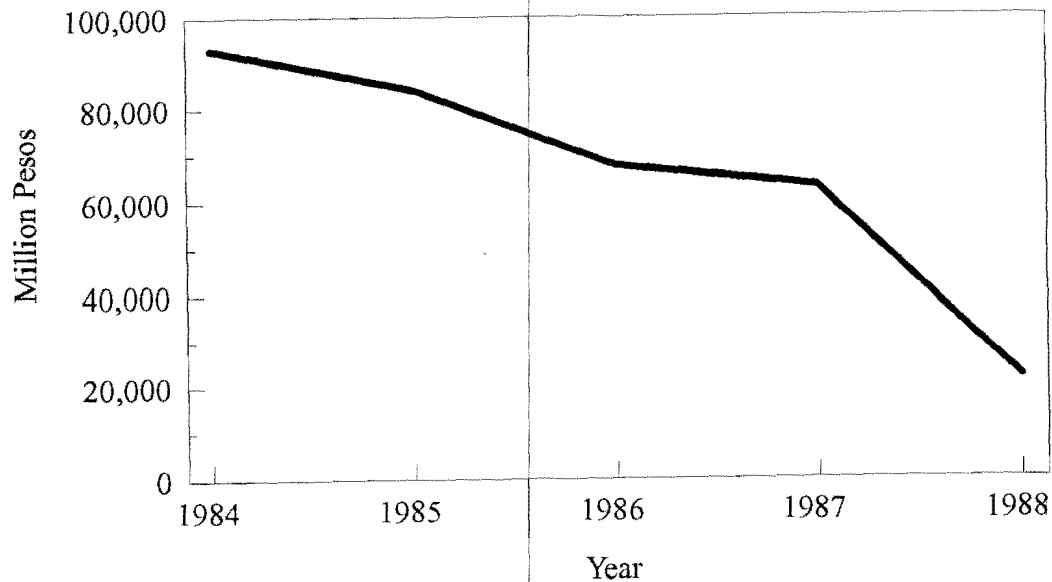
Mexican Infrastructure

The Mexican production, transportation, marketing, storage, and distribution infrastructure is severely underdeveloped relative to those of the U.S. and other developed countries and to the growing requirements of the Mexican economy to facilitate the current transition to more open markets. Unless significant public and private investments are made, the outdated and inefficient Mexican infrastructure will constrain potential growth of Mexican agricultural exports to the U.S. as well as of U.S. agricultural exports to Mexico.

Not all regions of Mexico face the same level of infrastructure problems that plague Mexico in general. For example, tomato producers in the Mexican state of Sinaloa reportedly have the necessary infrastructure in place, including irrigation, reliable transportation from Sinaloa to Nogales on the U.S. border, and dependable U.S. marketing channels, to respond to the incentives of a U.S.-Mexico FTA (Thompson and Martin). Nevertheless, in most areas of Mexico, underdeveloped infrastructure represents a significant obstacle to efficient operation and growth in agricultural production, processing, and marketing. For example, current growth in Mexican fruit and vegetable production is placing tremendous pressure on the outdated and inadequate level of irrigation water storage and delivery systems in the main production areas. One of the problems is that Mexican public investment in irrigation projects in real terms dropped by over 75% between 1984 to 1988, at an annual average rate of 20% (Figure 27). The experience of the Caribbean Basin Initiative has demonstrated that trade liberalization alone does not guarantee immediate increases in agricultural trade. The absence of infrastructure, transportation facilities, and marketing expertise can severely handicap producers as happened to fresh fruit and vegetable growers in the Caribbean and Central America (Thompson and Martin).

The Mexican transportation infrastructure, in particular, suffers from inadequate investment and inefficient public regulation and management. Although the most comprehensive in Latin America, the Mexican transportation system and related infrastructure has been inadequate to handle the recent increase in Mexican international trade (GAO). The Mexican rail system is outdated and lacks the capacity to carry the increasing cargo from the United States (GAO). Mexican storage capacity is severely limited and roads are in a state of general disrepair. Tremendous delays in loading, unloading, and movement within Mexico are frequently reported. Complicated, lengthy, and cumbersome customs clearance procedures at border crossing points add to the delays and the costs of transporting goods to and from Mexico. According to one estimate, for Mexican industries to efficiently access both national and international markets, the Mexican national highway network will

Figure 27: Mexico: Public Investment in Irrigation Projects, 1984 - 1988^a



^aAdjusted for inflation

Source: INEGIc, NFb

have to expand by 6.6% (16,000 km) at an estimated investment of \$22 billion by the year 2000 (Represas and Ferrer). Also, the current costs for modernizing the Mexican railway system has been estimated at \$2.5 billion (Represas and Ferrer).

Underinvestment has occurred in virtually all Mexican transportation services and related infrastructure in Mexico including highways, railroads, deep water ports, and airports and related services. The railroad network and the maritime and air transport industries in Mexico are government-owned and operated. Motor carriers are operated by the private sector but were heavily regulated until July of 1989. Trucks play an extremely important role in the exportation of horticultural products from Mexico to the U.S. Mexican railroads and deep water ports are extremely important to growing U.S. exports of grain and oilseed exports to Mexico.

The Mexican Railroad System

The Mexican railroad network includes almost 20,000 kilometers (km) and is operated by the government-owned *Nacionales de Mexico*. The Mexican Constitution reserves the right to own and operate railroads for the Mexican government. Private ownership or operation, either Mexican or foreign, is not permitted. The Mexican rail system is characterized by outdated infrastructure, facilities, and procedures. There is a critical lack of rolling stock. Both U.S. and Mexican industry spokesmen have noted cases in which rail cars were often unavailable for transport (USITC).

The Mexican rail system reportedly lacks the capacity to carry the increasing cargo bound from the U.S. to Mexico. Imported supplies awaiting transport face delays as long as 2 weeks or more (GAO). Further complications are created by outdated unloading facilities that delay turnaround time of U.S. cars destined for Mexico. Due to inadequate warehouse capacity for unloading, U.S. rail cars are often used for storage. A Union Pacific study determined that the average turnaround time for U.S. rail cars moving to Mexico City was 40 days (GAO).

Over the past decade, about 60% of the bulk commodities moving from the U.S. to Mexico has moved by sea and 40% by rail (Fuller). As trade volume has increased in recent years, however, up to 80% of U.S. bulk commodity exports to Mexico has moved by sea and 20% by land because of the inability of the Mexican railroad system to handle additional traffic. Consequently, U.S. sellers lose some of their competitive advantage in the Mexican market (GAO). Particularly vulnerable are U.S. grain exports to Mexico which must compete with the products of Argentina and Australia.

In an effort to improve the access of U.S. agricultural commodities to Mexican markets at reasonable prices, the Mexican government has recently entered into agreements with both Union Pacific and Santa Fe Railroads to allow them to operate within Mexico. The Union Pacific System connects with Mexico at Brownsville and Laredo, Texas. A shortline road operating between Corpus Christi and Laredo, the Texas-Mexican Railroad, also connects to Laredo, Texas. The Santa Fe connects with Mexico at El Paso and Presidio, Texas.

The Mexican Highway and Trucking System

Trucking is the leading transport industry in Mexico because railroad capacity has not grown in recent decades. About 82% of Mexican freight is carried by motor carriers. Since 1982, trucking has been adversely affected by slow or negative growth in per capita real income in Mexico and the

internal budget and external debt crises. Highway construction came to a virtual standstill in recent years and the replacement of trucks and trailers has been inadequate. Authorities have attempted to compensate for the inadequacy of highway transportation through regulatory measures which have only caused additional problems (Landeró).

Because trucks have been expensive in Mexico, entry into the industry has required a major initial investment and has been difficult to accomplish. In addition, over-regulation of the industry has erected additional barriers to entry. Until the recent deregulation, trucking in Mexico was divided into 11 routes nationwide. The industry was managed by regional, cartel-like organizations called "freight service centers" that determined cargo movement in their respective areas. These centers granted concessions to carriers and also allocated shipments of cargo among truckers. Each trucker was restricted to designated routes and types of cargoes. In turn, the centers were controlled by a small number of large truckers. These truckers enjoyed oligopolistic profits and, therefore, were able to withstand the adversities of the macroeconomic environment such as price controls and increasing costs of operation (USITC). Shippers in Mexico were adversely affected by the oligopolistic behavior of the trucking industry in many ways. Most importantly, shippers were not free to choose their carriers. Moreover, the oligopolistic nature of the system resulted in an increase in shipping costs, contributed to the obsolescence of the trucking fleet, weakened the quality of services, and left certain areas without service (Landeró).

A new Mexican trucking deregulation decree addresses the provisions in the 1989-94 National Development Plan which calls for updating and modernizing pertinent institutions and regulatory mechanisms to make Mexican transportation more efficient and competitive. Mexican officials hope that the relative freedom now granted in setting rates and the resulting price decline will reduce the excessive profit margins of carrier oligopolies. Officials also expect that a liberalized highway transportation market will encourage services to be provided for poorly served areas and generally increase the availability of trucking for users (USITC).

The Mexican government also authorized private companies, including foreign investors, to participate in building and maintaining highways beginning in 1989. The Federal government was previously the only Mexican authority in charge of planning and carrying out the coordination of the Federal deregulation program (in conjunction with municipal authorities) (USITC).

Of the 1.5 million mt of fresh Mexican produce imported by the U.S. in 1988/89, 32% arrived at the border in small trucks, 56% in tractor-trailer rigs, 11% by piggyback, and the remainder by

airplane. Leading import locations included Nogales (58%), Reynosa (18%), Tijuana (6%), San Luis (6%), Mexicali (4%), and four additional crossings in Tampico (6%). Most fresh vegetable imports from Mexico require hauls ranging from 300 to 700 miles. Based on suggested rates for refrigerated vans in August, 1990, motor carrier rates are estimated at about \$500/truckload (22.5 ton) for a 300 mile haul (\$1.11/cwt). For a 700 mile trip, the truckload rate would be about \$935 (\$2.08/cwt). In general, these rates appear to be higher than comparable interstate hauls in the U.S. (Fuller).

Mexican Deep Water Ports

Principal Mexican deep water ports involved in agricultural commerce include Ensenada, Baja California Norte (citrus, grain); Guaymas, Sonora (grain, cotton); Lázaro Cárdenas, Michoacan (grain, processed food); Manzanillo, Colima (grain); Salina Cruz, Oaxaca (coffee); San Carlos, Baja California Norte (cereal, cotton); Tampico, Tamaulipas (grain); Topolobampa, Sinaloa (grain); Yukalpetin, Yucatan (cold storage vegetables); Veracruz, Veracruz (cereals); Progreso, Yucatan (cereals); Tuxpan, Veracruz (cereals); and Mazatlan, Sinaloa (cereals) (*Lloyds Ports of the World*).

Mexico imported approximately 64% of grain, oilseed, and related products from all foreign suppliers via their ocean ports and the remainder (36%) overland in 1984. Approximately two-thirds of these marine-carried imports arrived at Gulf ports and about one-third at Pacific ports. Leading Mexican port areas in 1984 for the receipt of imported grains and associated products included Tampico (18%), Tuxpan (14%), Veracruz (23%), Guaymas (18%), and Mazatlan (7%).

Although all major Mexican ports have deep water, few provide a good harbor. Because five ports handle about 80% of all tonnage, port congestion is often a problem. Increased petroleum shipments, lack of cargo-handling facilities, and administrative bureaucracy also contribute to port congestion. For this reason, some Mexican shippers find it expedient to send their agricultural exports through Texas or California ports (GAO).

Consequences for U.S. Transportation Services

The motor carrier industry would likely be the most affected of the U.S. transportation industries by a U.S.-Mexico FTA (USITC). U.S. imports of trucking services from Mexico under an FTA would most likely increase significantly, primarily as a result of pronounced wage differentials between Mexican and U.S. workers. However, the overall effect on U.S. imports of all transportation services from Mexico would likely be moderate. At the same time, U.S. exports of trucking services

to Mexico would not likely increase because of the poor condition, considerably smaller size, and already overcrowded condition of the Mexican highway system (USITC). Nevertheless, the recent deregulation of the Mexican motor carrier industry and relaxation of Mexican restraints on foreign capital investment hold promise for the future of the Mexican transportation infrastructure.

Other U.S. transportation services, including rail, maritime transport, and air passenger and cargo services, would likely be affected relatively little by the agricultural trade impacts of a U.S.-Mexico FTA because these systems are already operating at close to capacity (Fuller). If an FTA removed the barriers that restrict private-firm participation in the Mexican railroad industry, the impact on the U.S. rail industry would depend on the extent to which U.S. rail transport firms expanded into the Mexican market. Because a relatively small portion of freight traffic is carried by rail in Mexico, liberalization of the Mexican rail transport system is not likely to have a significant impact on the access of U.S. agricultural commodities to Mexican markets without significant investments to expand and upgrade the outdated system.

Prospects for Mexican Transportation Infrastructure Constraints to U.S.-Mexico Agricultural Trade

Whether or not the Mexican transportation system and related infrastructure continue to restrain growth in U.S.-Mexico agricultural trade depends on the extent to which three major problems are resolved: (1) the access of the U.S. trucking industry to Mexico, (2) administrative constraints at border crossings, and (3) the shortage of investment capital to modernize and expand the Mexican transportation infrastructure.

A Mexican prohibition against *U.S. truck operation on Mexican highways* is a continuing constraint to expanded U.S.-Mexico agricultural trade. The longstanding Mexican discrimination against U.S. motor carrier operation led the U.S. to retaliate against Mexican carriers in 1984. U.S. legislation restricted the operation of Mexican truckers to commercial zones adjacent to the border. Disallowing commercial vehicle traffic between the two countries necessitates additional intermodal/intramodal transfer costs. The Mexican prohibitions against American motor carrier operation in Mexico puts U.S. truckers at a disadvantage to their Mexican counterparts who bring their cargo into U.S. commercial zones and then backhaul U.S. cargo into Mexico. At the same time, the prohibition effectively restricts the volume of commodities that can cross into Mexico from the U.S. and may increase shipping costs since Mexican trucking rates may be higher than U.S. rates.

Administrative procedures at overland border entry points are complicated, inconsistent, and lengthy which leads to congestion and long delays in processing cargo through customs from both directions but particularly from Mexico into the U.S. Periodic consultations between U.S. and Mexican customs officials have done little to alleviate the problem. Unless the problem is resolved, a U.S.-Mexico FTA may result in further congestion and impose increasing costs on shippers.

Even if a U.S.-Mexico FTA achieved standardization and harmonization of all transportation regulations and customs procedures between the two countries, massive *capital investment to modernize and expand Mexican infrastructure*, including packing facilities, storage, and transportation, will be necessary for an FTA to achieve long-run gains for both U.S. and Mexican agricultural importers and exporters. Without such capital investments, the Mexican transportation capacity constraint on U.S.-Mexico trade will create significant additional congestion at the higher trade levels that a U.S.-Mexico FTA might achieve. The general expectation is that an FTA will lead to greater availability of investment capital from the U.S. or other international sources for the development of Mexican infrastructure, such as packing facilities, storage, and transportation, to efficiently move U.S. agricultural commodities to major Mexican markets (Represas and Ferrer). An FTA, however, is unlikely to attract private domestic or foreign investment in public transportation systems because of the difficulty that a private investor would face in attempting to capture adequate returns to such investments. The public sector, consequently, will need to play a key role in providing or facilitating needed investments in the transportation infrastructure. The Mexican government has announced its intention to increase public investment in the construction of roads in agriculturally productive regions of Mexico to facilitate more efficient farm to market transport of farm commodities (Comercio Exterior). The basic aim of the program is apparently to encourage the location of food processing and storage facilities in these areas. Virtually no data is available, however, to indicate the rate and extent of such government investments in recent years.

Foreign Direct Investment in Mexican Agricultural Production and Processing

Until recently, foreign direct investment (FDI) in the Mexican economy was highly controlled and restricted by the Mexican government. Government restrictions on foreign ownership of Mexican businesses along with restrictions on foreign ownership of land allowed foreigners only limited access to Mexican agribusiness. Mexican investment laws were amended in 1989, however, to allow up to 100% foreign ownership of Mexican businesses (Polyconomics).

FDI in Mexican agricultural production has historically accounted for a negligible percentage of total FDI in Mexico primarily because the agrarian reform code prohibited foreigners from owning

land (Table 35). Foreign investment in Mexican agriculture has also been negatively affected by the extreme protectionist attitude of the Mexican government concerning agricultural commodities. Overall FDI in the Mexican economy increased about 62% between 1986 to 1990. During the same time FDI in agriculture increased about five fold from \$6 million to \$30 million but still only reached about 0.1% of overall FDI. The dramatic increase of FDI in the Mexican economy began about the time Mexico launched its economic reform program, acceded to GATT, and began unilaterally lowering trade barriers on nearly all imports, including those of most agricultural commodities.

In the Mexican food processing industry, FDI peaked at over \$600 million in 1983 (5.2% of total FDI) and then declined by about 17% annually through 1988 when it rebounded 81% in 1989 to \$466 million (1.8% of total FDI) (USITC). The reversal in the trend of FDI in Mexican food processing industry in 1989 is attributable at least in part to changes in Mexican foreign investment laws in that year to allow foreigners to hold a controlling interest in Mexican firms.

Factors Affecting Foreign Investor Confidence in Mexico

Continued FDI growth in Mexican agricultural production and processing will depend largely on foreign investor confidence in the security and potential returns on their investments. In general, foreign investor confidence is expected to increase upon implementation of a U.S.-Mexico FTA primarily because trade liberalization is expected to generate increased profitability of investments in Mexican economic activity, particularly in export-oriented sectors like agriculture. An FTA alone, however, could be inadequate to attract sufficient foreign capital investments to generate the needed economic growth in Mexico.

Foreign investor confidence in Mexico will depend critically on several factors, including: (1) the pace and extent of investment reforms in Mexico, (2) revisions in Mexican land tenure laws, (3) changes in Mexican labor costs relative to those in the U.S., (4) changes in the Mexican transportation and communication infrastructure, (5) revisions in Mexican sanitary, phytosanitary, and environmental regulations, (6) the overall performance of the Mexican economy, (7) Mexican political stability, and (8) perceptions of the permanency of Mexican economic reform.

Investment reforms, particularly since 1989, have significantly reduced Mexican regulation of investment, including some liberalization of foreign investment in Mexican businesses. The Foreign Investment Law of 1973 generally restricted foreigners from owning more than 49% of Mexican businesses, with the exception of the *maquiladoras*. *Maquiladoras* are Mexican

Table 35: Mexico: Accumulated Foreign Direct Investment by Economic Activity, 1980-1990

Activity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
----- millions \$US -----											
Industry	6,560	7,964	8,347	8,944	10,213	11,379	13,295	15,695	16,715	17,694	17,959
Services	717	1,034	1,272	1,285	1,407	1,842	2,165	3,599	5,477	6,489	6,871
Retail	755	924	926	984	1,016	1,125	1,277	1,255	1,502	1,887	1,906
Mining	420	234	237	252	258	276	307	356	381	391	391
Agriculture	8	5	5	5	6	6	6	22	10	28	30
Total	8,460	10,161	10,787	11,470	12,900	14,628	17,050	20,927	24,084	26,489	27,550

Source: NFb

manufacturers that can be fully 100% foreign-owned. These manufacturers are allowed duty-free entry of all machinery, materials, and equipment to establish plants, are allowed to export processed goods tax-free, and take advantage of low Mexican labor costs. The Mexican government began relaxing FDI regulations in 1986 and accelerated the process in 1989, opening 73% of Mexican economic activity to 100% foreign ownership (USITC). The turnaround in FDI in both the agriculture and food processing industries in Mexico in recent years has been a significant result that would be expected to continue if the recent investment reforms are retained. A possibility exists, however, that the recent actions to liberalize FDI in Mexico could be reversed since the 1973 investment law has never been legislatively repealed and could be changed at any time (USITC). This possibility is a potential deterrent for some foreign investors who may discount expected returns from investing in Mexico by the fear of having their investments "expropriated."

Revisions in Mexican land tenure laws and the Mexican *ejido* system will likely have a significant positive impact on foreign investor confidence in the Mexican agriculture sector. Given that the amount of Mexican farm land owned by the private sector will be effectively doubled under the new laws, the potential exists for a substantial shift of Mexican farm land to foreign ownership when the Mexican government gives *ejidatarios* title to the land they occupy. As mentioned earlier, however, much of the land that might become available for sale might not be particularly suited for agricultural production.

The *relatively low cost of labor in Mexico relative to the U.S.* has been an important factor in attracting FDI to Mexican industry. Although economic reforms and resulting economic growth in Mexico will continue to put upward pressure on Mexican wage rates, they are not expected to rise significantly in the near term. Cheap Mexican labor costs, therefore, should continue to attract FDI to Mexican industry including the food processing sector. Increasing Mexican imports of agricultural commodities from the U.S. and elsewhere, however, are pressuring resources, including labor, out of the Mexican agricultural sector. The consequence is growing unemployment in Mexican urban areas and negative pressure on Mexican wage rates. The recent changes in the land tenure system could exacerbate the situation. Increased availability of Mexican agricultural labor from import-competing sectors could enhance the attractiveness of FDI in the labor-intensive, export-oriented horticultural and citrus sectors in Mexico.

The underdeveloped, inefficient *Mexican transportation and communication infrastructure* discourages a greater level of FDI in Mexican agriculture and food processing. Without timely, easy access to market information nor the ability to rapidly transport and distribute commodities to

intermediate and final destinations, potential foreign investors may consider the expected returns on investments in agricultural production and processing to be too low. Although recently privatized and opened to foreign investment, the communications infrastructure of Mexico is still underdeveloped, under private monopoly control, and highly regulated making business communication difficult and costly in Mexico. Furthermore, market information for decisionmaking in agriculture is not as readily available in Mexico as in the U.S. Although privatization and economic reform continue in Mexico, the low level of investment in Mexican infrastructure will likely continue to discourage foreign capital investment in Mexican agricultural production and processing.

Lax sanitary, phytosanitary, and environmental regulations in Mexico have allegedly been key factors in attracting FDI to Mexico. The Mexican government is currently making a concerted effort to enforce compliance with existing regulations by foreign and domestically-owned companies. Compliance with new strict environmental regulations is reportedly required by new foreign investors wishing to move operations to Mexico. Additional domestic and international pressure is expected to continue pressuring the Mexican government to tighten up both the regulations governing environmental pollution and food health and safety and their enforcement. The drive by Mexico to boost agricultural exports will also force close monitoring and enforcement of these regulations if Mexico is to avoid potentially severe foreign food consumer opposition and pressure for stricter controls on imports of foods and food products from Mexico. Tighter regulations and more strict enforcement of them, however, could have both negative and positive implications for FDI. Compliance with stricter sanitary, phytosanitary, and environmental regulations is costly and would reduce any short-run competitive advantage for Mexican agriculture and food processing based on relatively looser regulations in this area. Over the longer run, however, tightening up and enforcing compliance with these regulations could enhance foreign market opportunities for Mexican produced and/or processed products.

The *overall performance of the Mexican economy* is among the most important factors affecting the level of foreign direct investment in Mexico. The strength of Mexican demand for agricultural products is highly dependent on the performance of the overall economy. A strong performance of the Mexican economy over time signals growing consumer disposable incomes and, consequently, an expanding demand base for agricultural and food products. The relatively low level of incomes in Mexico suggests that food consumption is highly responsive to changes in income (i.e., food demand is highly income elastic). Small increases in average incomes in Mexico translate into relatively larger increases in food demand. In addition, economic growth in an underdeveloped country like Mexico usually leads to a shift in the composition of foods consumed from traditional,

low-value foods to higher-value processed foods. Such shifts in consumer demand generally lead to increased demand for capital for investment in food processing, marketing, and distribution facilities.

Recent growth in the Mexican economy has helped create an improved economic environment for growth in foreign investment in agriculture. Without a U.S.-Mexico FTA, however, sustained economic growth in Mexico and foreign capital investment in Mexican agriculture is unlikely. During the 1970s and early 1980s, heavy foreign borrowing by the public and private sectors was the financial basis of the Mexican economic growth strategy. After a period of surprising growth, the eventual consequence was massive Mexican external debt and a suspension of foreign credit to Mexico. A sluggish economy fettered with government regulations and burdened with a huge external debt in the 1980s and 1990s has not generated sufficient internal investment to sustain growth and foster continued economic development. In fact, Mexican economic problems have been driving capital out of the country. Flight capital hit an estimated \$11 billion in 1990 and \$17 billion in 1991. The only viable option left to Mexico to attract flight capital back and generate new capital investment for economic development is to convince private foreign investors that Mexico is a safe, profitable place to invest their funds. The Salinas administration hopes to reduce perceived risks of investing in Mexico by freeing up trade between the U.S. and Mexico and aligning the smaller, less stable and efficient economy of Mexico with the larger and more robust U.S. economy. Failure to conclude an FTA with the U.S. could send a message to the international financial community that Mexico is not ready for substantial investment of private foreign capital.

Political stability along with perceptions of the *permanency of economic reform* in Mexico also affect foreign investor confidence in the Mexican economy. Mexico has a long history of political and economic volatility. Foreign investors are concerned about the future of the economic reforms instituted by Salinas when he leaves office next year since most of the reforms have been accomplished simply by presidential decree. The policy changes imposed by the Salinas administration are broad and sweeping in nature and could result in social unrest. For example, a popular move to return to the nationalistic and protectionist policies of the past could occur if the proposed changes in the land tenure laws result in massive unemployment in rural areas and subsequent migration to major urban centers. Perceptions of political instability and the possible reversal of the current policy direction could have serious consequences for current and future FDI in Mexico.

*Benefits and Costs of Foreign Direct Investment
in Mexican Agricultural Production and Processing*

For a given potential foreign investor considering whether or not to invest in particular agricultural or food processing activities in Mexico, the investment decision depends on the extent to which the potential perceived benefits outweigh the costs. Currently, the chief attractions for foreign direct investment in Mexican agriculture and agribusiness include low labor costs, relatively looser environmental, labor, chemical use, and other regulations, and proximity to large and growing Mexican urban centers (Table 36). The costs involved in making such investments include the inadequate, underdeveloped Mexican infrastructure, the currently low level of per capita consumer purchasing power in Mexico relative to levels in the U.S. and other developed countries which limits market demand, the relatively inefficient and unstable political system in Mexico, and the difficult, cumbersome legal system that makes contract enforcement difficult in Mexico.

If the U.S. and Mexico fail to conclude an FTA, then it could be assumed that little would occur to alter the current perceived relationship between the benefits and costs of investing in agriculture and agribusiness. Without a U.S.-Mexico FTA, major investments of foreign capital are likely to continue to occur primarily in those sectors, such as fruits and vegetables, in which labor represents a significant enough share of the total costs of production that the benefits of low labor costs clearly outweigh whatever costs may be associated with the investment.

If the U.S. and Mexico successfully conclude an FTA that eliminates major tariff and non-tariff barriers to trade, however, incentive for additional FDI in Mexican agriculture and agribusiness in the short run would come primarily from one of two sources: (1) an increase in the general level of investor confidence and expectations regarding the future viability and performance of the Mexican economy and (2) reduced costs of labor as a result of the displacement of large numbers of laborers from the corn and other import-competing sectors of Mexican agriculture (Table 36). A long phase-in period for the reduction of trade barriers, however, could delay or reduce these incentives for FDI in the short run.

Over the longer run, a U.S.-Mexico FTA would likely reduce many of the costs of investing capital in Mexican agriculture and agribusiness. Economic growth and development in Mexico would strengthen consumer incomes and demand, provide incentive and generate tax revenues for public investment in infrastructure, reduce the political risks and administrative costs of doing business in Mexico, and create pressure for reforms in the legal system regarding contract sanctity and other

business laws (Table 36). At the same time investor confidence in a strong, growing Mexican economy would likely build. On the other hand, economic growth in Mexico would eventually lead to higher labor costs and intensify concerns and costs associated with environmental pollution, labor laws, etc. Even though the benefits of lower relative labor costs and loose regulations in Mexico would decline, the reduced costs of investing in Mexican agriculture and agribusiness would likely outweigh the loss of benefits. The reduction in investment costs would likely provide a relative incentive to investment in food processing and other less labor-intensive sectors of the Mexican agriculture and food industry.

Foreign Direct Investment in Mexico vs. Exports to Mexico

Even though U.S. processed food exports to Mexico have increased in recent years, many U.S. firms are opting for direct investment strategies to take advantage of the growing market in Mexico (Handy). Exports by U.S. food firms to Mexico were \$1.5 billion in 1991 while sales by their Mexican affiliates were over twice as much at \$4.1 billion. Sales by Mexican affiliates of U.S. food processors have grown rapidly recent years, increasing 34% from 1988 to 1989 and 20% in both 1990 and 1991. In contrast, U.S. affiliate sales for 1989 increased by only 8% in Canada, 20% in Europe, and 15% overall. Mexico now ranks eight as a host country for U.S. affiliates and the only less developed country among the top 10.

U.S. food processors operated 33 Mexican affiliates with sales of at least \$3 million in 1989, of which 8 were associated with fruits and vegetables, 6 with grain milling, 5 with beverages, 2 with dairy, 1 with baking, and 10 with "all other" (sugar, confections, fats and oils, snacks, seafood, and other food preparations) (Handy). Average sales per affiliate increased from \$55.4 million in 1988 to \$83.4 in 1989. The 33 affiliates employed 48,000 workers in 1987 and 50,000 workers in 1989.

Handy suggests three reasons that U.S. food processors might prefer direct investment strategies over exports to increase their presence in the Mexican market. First, direct investments allow food firms to circumvent trade barriers and eliminate the cost of transportation. Second, food firms can maintain better control over the marketing and distribution aspects of getting their products to Mexican consumers by locating production/processing facilities in Mexico. Finally, the Mexican government is now actively encouraging foreign investment. Through the Mexican Investment Board (MIB), the Mexican government in association with the private financial community provides potential investors with information on labor, offers advice on the viability of projects, helps cut red tape, and sets up meetings with government authorities.

Table 36: Costs and Benefits of Agribusiness Investment in Mexico With and Without a U.S.-Mexico FTA^a

Without a U.S.-Mexico FTA			
	Without an FTA	With an FTA	
		Short run	Long run
Benefits			
► <i>Low Labor Costs</i>	+	↑	↓
► <i>Loose Regulations</i>	+	0	↓
► <i>Proximity to Markets</i>	+	0	↑
► <i>Expectations</i>	+	↑	↑
Costs			
► <i>Inadequate Infrastructure</i>	-	0	↑
► <i>Low Consumer Income</i>	-	0	↑
► <i>Inefficient Political System</i>	-	0	↑
► <i>Difficult Legal System</i>	-	0	↑

- ^a
- + = benefit
 - = cost
 - ↑ = increased benefit or reduced cost
 - ↓ = reduced benefit or increased cost

Foreign Direct Investment in Mexico for Sales in Mexico vs. Exports to U.S.

There are some concerns that growing U.S.-Mexico trade and integration is creating an incentive for U.S. firms to relocate their operations to Mexico to lower their costs of the production with the intention of shipping their products back to the U.S. for sale. The perceived impact is a loss of U.S. jobs. With some exceptions, however, sales of U.S. food processor affiliates in Mexico are directed primarily to local rather than U.S. markets (Handy). U.S. food processing firms are essentially transferring production technology and marketing and management expertise to their affiliates or partners in joint ventures and appear to be more concerned about Mexico as a potential market for their products rather than as a "platform" for their export sales back into the U.S. Available data indicate that only about 6% of U.S. imports of processed foods from Mexico came from U.S.-owned affiliates. Most likely, a U.S.-Mexico FTA would provide an incentive for the continuation of this pattern of U.S. FDI in Mexican food processing, particularly if the agreement stimulates growth in real purchasing power among Mexican consumers.

Mexican Agribusiness Strategy

Mexican food processing agribusinesses typically account for about 30% of the output of the Mexican manufacturing sector. The meat and dairy industries combined contributed the greatest share of gross output to the Mexican food processing sector (254.8 billion pesos) followed by corn and wheat (98.8 billion pesos and 70.9 billion pesos, respectively). These three industries typically account for more than 50% of the total food and beverage processing gross output in Mexico (Table 37).

In terms of the value of total assets, however, the beverage industry (soft drinks, malted beverages, liquors) is the largest subsector of the Mexican food sector (875.1 billion pesos), followed by oils (254.8 billion pesos), sugar refining (233.6 billion pesos), cereal milling (231.0 billion pesos), and baking (202.8 billion pesos) (Table 38). The smallest Mexican food industries measured by total assets are meat (76.3 billion pesos), corn milling and tortilla manufacturing (81.3 billion pesos), cocoa, chocolate, and confectioneries (85.7 billion pesos), dairy processing (136.8 billion pesos), and preserved foods other than meat and dairy products (186.0 billion pesos).

The most concentrated Mexican food industries are sugar refining (104 establishments), oil production (117 establishments), preserved foods other than meat and dairy products (385 establishments), cocoa, chocolate, and confectioneries (463 establishments), cereal (except corn) milling (661 establishments), beverages (887 establishments), and meat processing (870 establishments). The least concentrated food industries, on the other hand, are corn milling and tortilla manufacturing (23,008 establishments), baking (10,428 establishments), and dairy processing (7,449 establishments) (Table 38).

The average four firm sales concentration was about 40% during the 1970s which is relatively low compared to the U.S. situation (Connor). The food processing sector as a whole expanded gross output by about 8% from 1984 to 1989. The industries that contributed most to growth in food processing output during the 1980s were fruit and vegetable processing, malted beverages, soft drinks, and corn milling and tortilla manufacturing (refer to Table 37).

The current operational strategy of Mexican agribusiness involves a close relationship between Mexican affiliates of multinational corporations and privately owned Mexican-based agribusinesses with a high level of government involvement which has evolved over a number of years. As the government reduces its role in the agricultural sector and with significant changes in investment, foreign ownership, land tenure and other laws, this relationship will likely continue to evolve. A

Table 37: Mexico: Gross Output of the Manufacturing Sector and Food Processing Subsector, 1984 - 1989

Activity	1984	1985	1986	1987	1988	1989
----- million 1980 pesos -----						
Total Manufacturing	2,420,647	2,555,677	2,428,260	2,499,193	2,578,219	2,747,198
Total food and beverage processing	766,699	787,751	785,932	783,701	785,154	827,106
Food processing:						
Meats and dairy products	259,035	262,664	268,845	257,620	252,835	254,801
Fruits and vegetables	17,677	19,839	21,083	23,013	21,567	26,518
Wheat	71,980	70,304	65,162	67,335	68,869	70,877
Corn	90,622	93,448	92,448	94,039	95,967	98,757
Coffee	31,875	30,624	31,771	32,314	33,831	34,539
Sugar	40,294	42,240	47,606	49,229	44,217	42,991
Oils	48,158	51,147	42,995	46,925	47,503	48,466
Animal feeds	27,404	26,064	24,167	20,455	20,399	21,739
Other	66,070	72,817	76,354	74,319	77,998	87,217
Total food processing	653,115	669,147	670,431	665,249	663,186	685,905
Beverages:						
Liquors	32,400	31,548	28,765	29,990	28,956	33,206
Malted beverages	37,042	39,796	41,172	44,192	45,581	51,895
Soft drinks	44,142	47,431	45,564	44,275	47,431	56,100
Total beverages	113,584	118,775	115,501	118,457	121,968	141,201

Source: INEGIc

Table 38: Mexico: Characteristics of the Manufacturing Sector and Food Processing Subsector, 1985

Activity	Number of Establishments	Number of Persons Employed	Total Assets	Total Fixed Assets	New Capital Formation
			----- million pesos -----		
Total manufacturing	129,401	2,576,775	19,597,676	15,561,199	1,074,615
Food and beverages:					
Meat industry	870	22,819	76,323	59,385	7,680
Dairy processing	7,449	44,696	136,754	100,322	10,362
Preserved foods other than meat and dairy products	385	44,875	185,961	130,925	14,316
Cereal milling (except corn)	661	22,562	230,952	154,235	12,545
Corn milling and tortilla making	23,008	62,656	81,327	76,313	4,780
Baking	10,428	88,584	202,649	175,053	11,218
Oils	117	16,474	254,815	133,068	9,899
Sugar Refining	104	45,352	233,555	218,775	5,876
Cocoa, chocolate, and confectioneries	463	18,247	85,670	63,980	4,420
Other food products for human consumption	2,091	28,561	213,866	156,919	7,933
Beverages	887	102,318	875,086	707,583	26,246
Total food and beverages	46,463	497,144	2,576,958	1,976,558	115,275

Source: INEGIc

U.S.-Mexico FTA will provide additional pressure for change in the operational strategy of Mexican agribusiness.

Multinational Corporations and the Mexican Agribusiness Sector

Multinational corporations (MNCs) are prevalent in the Mexican food processing industry, particularly those with high levels of product differentiation and high average sales and concentration levels such as fruit and vegetable processing and packing, cereals, pastries, baby foods, soft drink manufacturing, and specialized dairy processing including preserved milk and puddings (Connor). MNCs are less prevalent in Mexican agribusiness industries with less product differentiation and lower average sales and concentration levels such as bread baking, tortilla manufacturing, fluid milk bottling, and meat packing. During the 1970s, one third of the 331 leading food manufacturing companies in Mexico were majority foreign-owned MNCs. Another 9% were minority foreign-owned (Connor).

Involvement of MNCs in the Mexican food industry began in 1929 when Libby opened a large food factory north of Mexico City in the Querétaro region. Significant growth in MNC involvement in Mexican food processing, however, did not occur until after World War II. Many of the MNCs currently operating in Mexico were already well established by the early 1970s. Food processing MNCs were attracted to Mexico by lucrative markets emerging with the rapidly growing urban middle class. Many of them located in the agriculturally rich Bajío valley near Mexico City (Slater).

Handy estimates that at least 14 of the 50 largest U.S. food processing firms had Mexican affiliates or participated in joint ventures with Mexican food or feed processing partners in 1990 including Ralston Purina, CPC International, Kraft, Campbell, PepsiCo, Quaker Foods, Universal Foods, Coca Cola, Borden, Kellogg, Hershey, McCormick, Gerber, and Tyson Foods (Table 39). Another source indicates that other food-related MNCs also currently operate in Mexico, including Anderson-Clayton, Fud, Cynanid, Acco, Carnation, General Foods, Danon, Del Monte, Beatrice Foods, and Nestlé (Polanco). Many smaller U.S. food processors also have ownership interests in food processing operations in Mexico.

The Ralston Purina affiliate operates balanced livestock feed plants in Mexico and just constructed a new, ready-to-eat cereal plant (Handy). The CPC affiliate refines corn oil and produces salad dressings, cooking oils, and margarine. The Philip Morris (Kraft) affiliate

Table 39: Major U.S. Food Processing Firms with Affiliates or Joint Ventures in Mexico, 1991

U.S. Parent	No. of affiliates or joint ventures	U.S. Parent	No. of affiliates or joint ventures
Ralston Purina	10	Coca Cola Co.	1
CPC International	5	Borden	1
Philip Morris (Kraft)	3	Kellogg Foods	1
Campbell Soup	2	Hershey Foods	1
PepsiCo Inc.	2	McCormick & Co.	1
Quaker Foods Co.	2	Gerber Products	1
Universal Foods	2	Tyson Foods, Inc.	1

Source: Handy

manufactures frozen, dairy, and other packaged foods. With additional investments in 1990, PepsiCo is now the largest salty snack and cookie manufacturer in Mexico and owns a concentrate syrup plant. The Campbell affiliate produces canned and frozen vegetables and other food ingredients and ships tomato paste and other prepared foods to its U.S. operations. The Universal Foods affiliate produces flavoring and coloring products. The Quaker Oats plant manufactures cereal and chocolate products and is expanding into sports drinks. Food processors in other countries also have affiliates in Mexico, including Pillsbury (Green Giant) and A.E. Staley, both owned by British firms, and Central Soya, owned by an Italian firm.

In addition to establishing food processing affiliates in Mexico, the strategy of other food processing MNCs in the Mexican market has been to develop joint ventures with established Mexican firms (Handy). McCormick, for example, has participated for many years with a Mexican firm that produces McCormick brand mayonnaise and spices. Gerber has the same type of set up for producing baby foods for sale in Mexico. Tyson Foods has established a three-way joint venture with a Mexican and a Japanese firm in Mexico. Tyson provided technical assistance in developing a poultry processing plant in Mexico owned by the Mexican firm. Tyson exports whole broilers to the Mexican processing plant and the Mexican firm exports the processed chicken to the Japanese firm which distributes the processed poultry in Japan.

Other U.S. food processors have limited, distribution joint ventures with Mexican food processors (Handy). The U.S. firm of Sara Lee, for example, recently entered into a joint venture with Bimbo, the largest bread and bakery product manufacturer in Mexico, to distribute Sara Lee bakery and meat products in Mexico. In return, Sara Lee will assist Bimbo in distributing its bakery products in the U.S. Still other U.S. food companies, such as McLane Co. (owned by Wal-Mart) and Labatt Food Service are investing in wholesale distribution centers in Mexico. Both Wal-Mart and the Price Co. have established joint ventures with Mexican firms to open membership wholesale clubs in Mexico. These wholesale sales and distribution joint ventures should help U.S.-based food companies break into the Mexican market through sales of food products manufactured in the U.S. or by Mexican affiliates of those firms.

Even without a U.S.-Mexico FTA, the economic reforms, unilateral liberalization, changes in Mexican investment, foreign ownership, and land tenure laws, and the enticings of the Mexican government will continue to lure U.S. food processors to Mexico through joint ventures or establishing Mexican affiliates. A U.S.-Mexico FTA will provide additional opportunities for continued investment by U.S.-based food processing firms in Mexico or through joint ventures. Rather than a relocation of operations, however, most U.S.-investment in the Mexican food processing industry will likely be an expansion of activities as a means of servicing a growing Mexican market if recent trends are any indication. Continued growth in Mexican markets, however, will be crucial if such U.S. investments are to continue. This is perhaps the most important role that a U.S.-Mexico FTA could make in fostering continued U.S.-based FDI in the Mexican food processing sector.

The Role of the Domestic Mexican Agribusiness Sector

In the early 1970s, the Luis Echevarría administration became concerned that Mexico was becoming too culturally and economically dependent on its Northern neighbor because the U.S. accounted for over 66% of Mexican foreign trade and 75% of foreign investment in Mexico. Consequently, tough new restrictions on foreign investment and trade were instituted, including mandatory local majority ownership and management control for all new businesses and more stringent patenting and licensing regulations (Slater). The result was a sharp decrease in MNC activity and capital investment in Mexico in the 1970s and 1980s. Because the Mexican demand for processed foods continued to increase, a number of large Mexican-owned food processing firms subsequently developed. Some of the major food-related Mexican firms include Maribel (baked goods), Darel (dairy products), Carta Mo (cooking oil), Zwan (meats), and Modelo (beer). The change in Mexican

FDI laws in 1989, however, eased restrictions on MNC activity in Mexico and has forced Mexican-owned firms to compete more directly with MNCs once again (Slater).

The small and medium-sized Mexican agribusiness firms generally utilize technologies typical of the U.S. food processing industry 50 years ago. Most of the larger Mexican-owned companies and some of the medium-sized companies, however, utilize world-class processing technologies (Slater). Mexican-owned companies typically dominate low-level processing such as corn milling and tortilla manufacturing, bread baking, meat packing, fluid milk bottling, and ice cream. These food processing groups are characterized by large numbers of small, family-controlled businesses. Several large Mexican firms control the highly concentrated beer brewing industry which has also developed into a viable export industry (Slater). Mexican beer is now second only to German beer in popularity among U.S. beer imports.

Increasing competition with MNCs has created some incentive for Mexican food processors to seek out joint venture opportunities with U.S.-based food processors. This is particularly the case since the majority of the competition is from Mexican affiliates of U.S. food processors rather than exports to Mexico from U.S. food processing plants. Because many Mexican food processors are at a disadvantage to U.S. food processors in production technology, management techniques, and marketing expertise, growth in Mexican food demand triggered by a U.S.-Mexico FTA will likely provide a relative advantage to U.S. processors to expand their presence in Mexico through direct exports, joint ventures, or investments in the establishment of Mexican affiliates.

Government Involvement in the Mexican Agribusiness Sector

Involvement of the Mexican government in the food processing industry has historically been through CONASUPO which has processed and distributed a large share of the Mexican production of basic commodities in Mexico through its four food processing affiliates: ICONSA (CONASUPO Grain and Oilseed Industries), LICONSA (CONASUPO Industrialized Milk), MICONSA (CONASUPO Industrialized Maize), and TRICONSA (CONASUPO Industrialized Wheat). ICONSA supplied about 18% of the domestic market for oils and 36% of the domestic market for corn flour in the mid-1980s. LICONSA operated 10 milk collection centers, 651 small dairies, and 20 major processing plants. MICONSA continues to operate five plants that manufacture corn flour. TRICONSA operated wheat flour mills, storage facilities, and distribution centers (Slater). Because the goal of CONASUPO has traditionally been to provide affordable basic foods to the poor, the Mexican government has

contended that CONASUPO has not competed directly with the private sector. Nevertheless, CONASUPO has controlled a significant share of the Mexican food market over the years (Slater).

The role of CONASUPO in food processing has diminished substantially since 1989 through efforts to disincorporate, sell off, divest interest in, or restructure these food processing affiliates (Table 40). CONASUPO has been attempting to sell some of the LICONSA milk processing plants. ICONSA has been disincorporated. MICONSA has been restructured to focus more specifically on corn processing for tortilla production for low income households. TRICONSA was liquidated in 1987. The effort to scale back the role of CONASUPO in food processing is part of the overall Mexican economic reform program to eliminate inefficiencies and allow greater market determination of the levels of supply, demand, and price in the agricultural sector.

The Mexican government has also been highly involved in the food marketing system from setting food prices to controlling distribution through CONASUPO food retailing, wholesaling, and distribution affiliates. The Mexican government traditionally has set two types of prices for agricultural products: (1) guaranteed prices at the farm level for basic foods like corn and dry beans and (2) official prices or ceiling prices that are fixed for certain value-added foods at the consumer level such as milk, tortillas, pasta products, cooking oils, etc. *Guaranteed* prices are the price support levels at which CONASUPO has purchased basic commodities from producers. *Official* prices are the low levels at which CONASUPO has sold processed commodities to consumers. The new agreement pricing system described earlier is replacing the guaranteed/official pricing system for all commodities except corn and beans. This change in pricing strategy relegates CONASUPO to the role of mediator in price negotiations between private sector buyers and sellers of basic commodities.

CONASUPO eliminated marketing support for all basic commodities except corn and beans in 1989 but continues to intervene in food wholesaling, retailing, and warehousing in Mexico through its affiliates IMPECSA, DICONSA, ANDSA, and BORUCONSA (Grennes, et.al.). IMPECSA provides wholesale services to small, private food retailers. DICONSA operates several nationwide chains of retail grocery stores, some of which are for targeted low income consumers in rural areas and others for both targeted low income and other consumers in urban areas. ANDSA and BORUCONSA provide warehousing services. ANDSA operates silos, warehouses, and cold storage facilities in urban areas. BORUCONSA provides storage for basic crops grown in more remote rural areas. ANDSA is modernizing its facilities and linking them to Mexican transport and port facilities. BORUCONSA is expanding its geographic coverage and scope of activities, including providing storage services to producer organizations, distributing fertilizers and pesticides, and procuring crops in remote areas.

Table 40: Mexico: Status of CONASUPO Affiliates, 1991

Affiliate	Status	Commodity/Area
LICONSA	Some restructuring and divestiture	Milk production and distribution
ICONSA	Disincorporated	Grain and oilseed processing
MICONSA	Restructured	Corn processing for tortillas
TRICONSA	Liquidated	Bread and wheat products
IMPECSA	Continuing	Wholesale food distribution
DICONSA	Continuing	Food retailing
ANDSA	Restructured	Food storage (urban areas)
BORUCONSA	Restructured	Basic crop storage (rural areas)
PRONAGRA	Disincorporated	Grain production

Source: Based on Grennes, et.al.

The continuing reduction in the role of CONASUPO in food processing in Mexico will likely help create an environment conducive to increased FDI in the Mexican agribusiness sector. Less competition from CONASUPO in processed food markets could also encourage increased U.S. exports of processed foods to Mexico. At the same time, the continued involvement of CONASUPO in food wholesaling and retailing will continue to provide competition for the development of private firms in this area. The impact may be limited, however, since CONASUPO attempts to target primarily low income consumers. Economic growth as the result of a U.S.-Mexico FDI would likely create a growing demand for more extensive and efficient private food wholesaling, retailing, and distribution services and related infrastructure to meet growing food demand. Unless such growth occurs, however, the opportunities for investment in the food marketing area in Mexico may be limited. Opportunities for a few joint ventures with Mexican firms, such as that being undertaken by Wal-Mart, or FDI in food marketing in Mexico are being created by the Mexican economic reform program which has managed to achieve some turnaround in economic growth and per capita incomes in recent years. Over time, however, sustained economic growth will be necessary to achieve a significant modernization and expansion of the Mexican food marketing system. A U.S.-Mexico FTA may provide such a boost to the Mexican economy as many expect.

Technological Change in Mexican Agriculture

Growth in trade between two countries can either result from or cause technical change in either or both countries. In the case of U.S.-Mexico agricultural trade, the recent growth has largely resulted from unilateral trade barrier reduction and other economic reforms by Mexico that have eliminated market distortions and moved Mexican agricultural competitive advantage more in line with the underlying comparative advantage. The growing trade, however, is causing pressures for technical change in the Mexican agriculture and agribusiness sector. Following a brief discussion of the relationship between trade, technical change, and development, this section discusses those areas in which the greatest pressures and opportunities for technical change exist in Mexico and their implications for Mexican agricultural development. The role of the public sector in Mexico in the required agricultural and agribusiness technology development and transfer process is then considered.

Agricultural Trade, Technical Change, and Development

The comparative advantage underlying the pattern of agricultural production and trade between two countries is dynamic. That is, comparative advantage can be gained and lost. The basic resource endowments of land, labor, and capital that determine comparative advantage are not fixed for all time. In particular, comparative advantage can be gained (and maintained) through investment in the adoption and/or research and development of cost-reducing technologies. On the other hand, comparative advantage can be quickly lost through inadequate investment in new technology.

In this age of rapidly expanding worldwide technological progress in agriculture, a steady growth of investment in technology development and adoption is needed simply to maintain, much less expand, the existing comparative advantage that a country enjoys in the production and trade of particular agricultural commodities and products. Developed countries, in particular, are investing heavily in biotechnology and other technological advances that have the potential to increase agricultural productivity and significantly reduce their costs of production relative to those of developing countries.

Such shifts in comparative advantage have tremendous consequences for the pattern of world trade. Developing countries have been increasingly forced to choose between shielding their agricultural sectors from the dynamics of world comparative advantage through protective import policies or becoming increasingly dependent on developed countries for their food and agricultural needs. In choosing the import protection alternative, however, developing countries also sever the

linkage of their agricultural sectors to world markets and, therefore, curtail the pressures for technical change and the opportunities for technology transfer consistent with comparative advantage. As a consequence, some developing countries, such as Taiwan, South Korea and now Mexico, have recognized the increasing technological disadvantage of their agricultural sectors and have attempted to open up their markets to international trade once again.

Although most developing countries, including Mexico, have national programs for the funding of technology development and commercialization, technical change in these countries most often occurs through the transfer of technology from developed countries. In Mexico, federal government expenditures on science and technology amounted to only 0.4% of all government expenditures in 1988 (NFb). Agriculture accounted for only 15% of federal expenditures on science and technology. On the other hand, of all contracts for technology transfer registered with the federal government in Mexico between 1983 and 1988, 8.2% were in the area of agriculture and food (Table 41).

The transfer of new technology embodied in improved seeds, breeding animals, higher yielding genetic material, and production chemicals (pesticides, herbicides, fungicides, and fertilizers) to developing countries is intended to raise productivity and reduce costs of production. Unfortunately, such technologies are not always successful in achieving those goals for at least two reasons. First, technologies developed for climatic, soil, and geographic conditions unique to more temperate-climate developed countries may not adapt well to the warmer and more tropical or arid conditions in many developing countries. Years of research may be required to fully adapt technologies adopted from developed countries to the conditions of the developing country.

Second, technologies available for adoption by developing countries are generally developed in response to the pressures and bottlenecks defined by commodity market and resource conditions in the developed countries which are likely very different from those prevailing in the technology-adopting developing countries. As Hayami and Ruttan point out, land is relatively abundant and labor scarce in most developed countries while the opposite is generally the case in developing countries. Technology develops in the more developed countries as a means to relieve the labor constraint by allowing the substitution of new inputs for labor. Such technology is referred to as "labor-saving" and generally involves mechanical innovations. Such technology allows each relatively more scarce labor input to become more productive by being able to utilize (or farm) the more abundant land more effectively. Mechanical technology is designed to facilitate the substitution of power and machinery for the scarce labor resource. This technology involves the substitution of land

Table 41: Contracts for Technology Transfer to Mexico, Registered with Mexican Federal Government, by Sector 1983-1988

Contract Type	Agriculture ^a	Food ^b	Other	Total
	----- number of contracts -----			
Trademark use	6	450	2,284	2,740
Patent use	--	15	353	368
Industrial design	--	--	14	14
Trade name use	--	22	409	431
Technical expertise	14	125	1,785	1,924
Technical assistance	25	147	3,048	3,220
Engineering	--	27	511	538
Business administration	27	254	3,332	3,613
Consulting services	--	14	318	332
Copyrights	--	25	564	589
Computer programs	2	56	1,271	1,329
Total	74	1,135	13,619	14,828

^a Agriculture, livestock, forestry, and fishing.

^b Food products, beverages, and tobacco.

Source: NFb

for labor because higher output per worker through mechanization usually requires the cultivation of more land area per labor unit (Hayami and Ruttan).

In contrast, labor is relatively more abundant than land in Mexico and most other developing countries. Thus, the optimum technology for adoption or development is that which would relieve the land constraint and take advantage of the abundance of labor. Such technology is referred to as "land-saving" and generally involves biological and chemical innovations. Biological and chemical technologies allow each relatively more scarce unit of land to be more productive by utilizing the more abundant labor more effectively. These technologies are designed to relieve the land constraint to increased agricultural production through innovations that allow a more intensive use of labor per unit of land. Biological and chemical innovations require additional treatments of land which requires more labor. Labor-intensive cultural practices and management techniques are also technologies that are "land-saving."

Thus, "labor-saving" mechanical technology imported from developed countries may increase the productivity of labor in developing countries but is not likely the optimum technology for agricultural development in those countries. Appropriate types of technologies include innovations involving the development of land and water resources, chemicals to enhance soil fertility, biological and chemical means to protect plants and livestock from pests and disease, and new crop varieties specifically adapted to the environmental conditions of the country.

Technical Change in Mexican Agriculture and Agribusiness

The relative abundance of land to labor in the U.S. essentially resulted in the development of agriculture on the basis of mechanical, labor-saving technology which led to more capital-intensive farming methods. Mexico, on the other hand, is relatively labor-rich and land-poor suggesting that the optimum path for development of the Mexican agricultural sector must involve innovations that relieve the land constraint and make more efficient use of labor. In the absence of the availability and investment in the development of such technologies, Mexico has historically opted for a political solution to the land constraint problem through land reform. The *ejido* system was an attempt to allow a more intensive use of labor per unit of land. The recent changes in the land tenure system, however, suggest that the lost economies of size and other sacrifices of efficiency have apparently outweighed the perceived social welfare benefits of the system. As the *ejido* system undergoes adjustment to allow larger farm units, however, critically needed investments and technologies will be those that promote labor-intensive activities. Otherwise, massive agricultural labor displacement could be the result with all the attendant implications for unemployment and Mexican labor migration to the United States.

At the same time, growing U.S.-Mexico trade, which is likely to intensify under an FTA, is also creating growing pressure for adjustment by agricultural labor resources. It is precisely this pressure, however, that is creating a relative incentive for investments in the transfer and development of labor-intensive food production and processing technology in Mexico. One consequence has been recent strong growth in FDI in Mexican agriculture and agribusiness which has involved significant investments in technology transfer and adoption.

The most highly labor-intensive agricultural activities in Mexico include horticultural crop production and processing, livestock raising and processing, dairy production and processing, and a large number of various low-level processing activities such as corn milling and tortilla manufacturing, bread baking, meat packing, fluid milk bottling, and ice cream manufacturing.

characterized by small, family-controlled businesses. Mexican corn, beans, and other basic commodity sectors are also still highly labor-intensive as well because of Mexican agricultural policy that continues to encourage a relatively high labor-to-land ratio in their production. As noted earlier, the technologies utilized by most small and medium-sized Mexican agribusiness firms are fairly labor-intensive and are typical of those used by the U.S. food processing industry 50 years ago.

Four problems generally characterize current investments in technology for the Mexican agricultural and agribusiness sector. First, most of the investments are in capital-intensive technologies of types developed and in use in developed countries rather than more labor-intensive types. The consequence is that the labor intensity of Mexican agricultural and food processing industries is likely lower than might otherwise be the case, contributing to the already high level of unemployment in Mexico.

The second problem is that current investments in Mexican agricultural and food processing technology are creating bottlenecks in production, distribution, and trade of those commodities. Inadequate investments in public agricultural research and development, irrigation systems, transportation infrastructure, distribution, storage, and marketing systems, and agricultural credit and related institutions create serious bottlenecks to the full realization of the productive potential of the new or adopted technologies (Hayami and Ruttan). These bottlenecks also reduce the profit potential of additional investments in technology transfer and development. At the same time, however, such bottlenecks create increased social pay-off to investment in the development of technologies to relieve the cause of the bottlenecks. Thus, the current Mexican infrastructure bottleneck resulting from rapid growth in U.S.-Mexico agricultural trade implies that the pay-off to investment in transportation and other infrastructure technology is increased by investments in modern food processing technology in Mexico. If investment in infrastructure technology is induced by the increase in pay-off, the infrastructure bottleneck will be eased and additional employment opportunities will be created for displaced agricultural labor.

The third problem created by current investments in agricultural and food processing technology in Mexico is a widening income disparity among Mexican farmers and agribusiness operators. Small and medium-sized farms and agribusinesses in Mexico often have much less access to new technologies than large multinational food corporations because of a lack of investment capital. New-technology-based increases in production by the large commercial farms and agribusinesses in Mexico lead to a drop in market prices and incomes. For example, investments in fruit and vegetable processing technology that allow large Mexican producers and packers to take advantage of the export

opportunities that a U.S.-Mexico FTA might create would put small and medium-sized fruit and vegetable processors in Mexico at a competitive disadvantage.

Finally, much of the technology in which domestic and foreign firms are investing is being transferred from other countries and adapted for use in Mexico rather than being developed within the Mexican public/private research sector. The U.S. has been the major foreign source of technology transfer contracts (NFb). Consequently, the increasing trade and investment in Mexico may not be creating the basis for the development of a strong public/private research and extension system to service the growing needs of small and medium-sized agricultural and agribusiness firms in Mexico.

The Role of the Mexican Public Sector in Agricultural Technology Research and Development

In the 1980s, Mexico had about 70 public and private schools of higher education in agriculture with an overall enrollment of about 50,000 students and 10 graduate programs (Turrent). There were also about 30 veterinary medicine schools of higher education. The agricultural programs in most of those schools focus on modern, capital-intensive production technology. Labor-intensive systems have received relatively less attention. Research funds at most of these institutions, however, are highly limited, particularly in the "autonomous" (private) schools.

Much of the agricultural research in Mexico is conducted at other public institutions, among which the most important are the *Instituto Nacional de Investigaciones Agrarias* (National Agricultural Research Institute), the *Instituto Nacional de Investigaciones Pecuarias* (National Livestock Research Institute), and the *Instituto Nacional de Investigaciones Forestales* (National Forestry Research Institute). The *Instituto Nacional de Investigaciones Forestales y Agropecuarias* (National Forestry, Agricultural, and Livestock Research Institute) coordinates the work of the other three. The *Secretaría de Agricultura y Recursos Hidráulicos* (Ministry of Agriculture and Water Resources), the Mexican equivalent of USDA, has its own research and extension network.

Given the budget constraints it faces, Mexico seriously underinvests in agricultural research and technology development programs in terms of both fiscal and human resources, like most developing countries. Mexican public investments in agricultural science and technology declined precipitously in real terms by over 70% between 1980 and 1988 (Table 42). Consequently, although foreign capital is being increasingly invested in technology for the development of certain Mexican agricultural and agribusiness activities, little is being done by the public sector to adapt and commercialize that technology for the Mexican agricultural industry in general. Of the total spent

Table 42: Mexico: Public Expenditures for Science and Technology by Sector, 1980-1988

Year	Agriculture ^a	Industry	Other	Total
----- million 1980 pesos -----				
1980	5,453	3,731	10,768	19,952
1981	5,169	4,301	14,142	23,612
1982	4,100	3,791	11,361	19,251
1983	2,115	2,775	8,754	13,644
1984	2,380	12,568	7,736	22,712
1985	3,428	3,036	10,881	17,345
1986	2,490	3,245	7,007	13,316
1987	2,341	2,657	8,360	13,357
1988	1,549	2,714	8,388	10,208

^a Agriculture and forestry only - does not include fishing.

Source: NFB

in 1987 by the National Council of Research and Technology (CONACYT), a major provider of research and development funds in Mexico, only 5.2% went for "science and technology diffusion" (NFB). The majority of CONACYT funds in that year went for "human resource development." Also, only limited research is being done to develop technologies to assist small and medium-sized firms to compete in an increasingly international Mexican agricultural marketplace.

The lack of public research funding is expected to be a major constraint to agricultural development in Mexico through the end of this decade at least. According to Hayami and Ruttan (pp. 165-166):

"Public sector investment in education in the biological sciences related to agriculture and [public] research capacity is essential if a nation is to successfully test and diffuse the indigenous technology employed by its own farmers, transfer and adapt the technology developed in other countries, and conduct the basic and applied research necessary to provide its farmers with a continuous stream of new ... technology [F]ailure to effectively institutionalize public sector agricultural research can result in serious distortion of the pattern of technological change and resource use [F]ailure to invest in public sector experiment station capacity is one of the factors responsible in some countries for the unbalanced adoption of mechanical, relative to biological, technology. Failure to develop adequate public sector research institutions has also been partially responsible for the almost exclusive concentration on research expenditures on the plantation crops and for the concentration on export crops The

major challenge for the developing countries is to develop the scientific and institutional capacity to design location-specific agricultural technology adapted to the technological and economic environment in which the new agricultural technology is to be employed."

Growing U.S.-Mexico agricultural trade is creating a dire need for higher education in Mexico to facilitate development of the Mexican agricultural sector in at least four ways: (1) the adaptation and commercialization of technology developed in other countries, particularly for small and medium-sized Mexican agricultural and agribusiness firms, (2) the development of new technology adapted to the conditions of Mexican resource endowments, (3) the training of *ejidatarios* and agribusiness owners in the purpose and use of new technology, and (4) the re-training of displaced agricultural labor. Without a significant increase in public sector investment in technology research and development in Mexico in real terms, the consequence will likely be little technology transfer or development in Mexico beyond that which is needed specifically to support investment of specific agribusiness operations in specific locations by specific investors. In such cases, the returns to those investments in technology could be either largely expropriated by foreign investors or at least could create little new growth and employment in Mexico.

CONCLUSIONS

This paper analyzes the likely future prospects for agricultural trade between the U.S. and Mexico with and without an FTA between the two countries. The interdependent relationship between the possible changes in U.S.-Mexico agricultural trade over time and key Mexican agricultural and agribusiness forces is also explored in some detail. These forces include Mexican agricultural policies, Mexican farm size and structure, Mexican agricultural labor, Mexican infrastructure, foreign direct investment (FDI) in Mexican agricultural production and processing, Mexican agribusiness strategy, and technological change in Mexican agriculture.

The conclusions of the study were reached through a qualitative analysis of the current and historical information available on U.S.-Mexico agricultural trade, the U.S. and Mexican agricultural and agribusiness sectors and government policies, U.S. and Mexican agricultural trade and domestic policies, and the Mexican macroeconomy. No attempt was made to empirically estimate the parameters representing economic behavior in U.S. or Mexican agricultural markets or to simulate the likely impacts of an FTA using a model of U.S.-Mexico agricultural trade. Consequently, the conclusions reached here should more properly be considered to be hypotheses in need of testing. Obviously, any number of events could transpire to change the findings reached here. Also, the

interrelationships in agricultural markets are sufficiently complex that subtle but key linkages and related impacts may not have been properly considered. Nevertheless, the findings provide at least the following general insights on the future prospects for U.S.-Mexico agricultural trade and key related Mexican agricultural and agribusiness forces.

First, the recent Mexican policy departure from extreme protectionism to more open, efficient markets is largely responsible for the rapid growth in U.S.-Mexico agricultural trade in recent years. Former constraints to building strong linkages between the U.S. and Mexican agricultural sectors have largely been eliminated through the unilateral reduction of tariff and non-tariff barriers by the Mexican government. Because comparatively little remains to be liberalized, a U.S.-Mexico FTA would likely stimulate little additional growth in trade of most agricultural commodities between the two countries at least in the short run.

Second, in the absence of an FTA, most of the impetus for continued growth in U.S.-Mexico agricultural trade would have to come from continued overall economic and per capita income growth in Mexico as a result of either increased market efficiencies as economic restructuring continues in Mexico and/or increased foreign capital investments in productive activities in the Mexican economy. The future pattern of U.S.-Mexico agricultural commodity trade in this case would continue to reflect the current competitive advantages of each country in agriculture.

Third, Mexico currently appears to have a competitive advantage in the production and export of at least feeder cattle, many horticultural products, and citrus. The U.S., on the other hand, appears to currently enjoy a competitive advantage in the production and export of breeding and slaughter livestock, dairy products, meat (particularly beef), most feed and food grains, deciduous fruits, and possibly cotton.

Fourth, the impact of an FTA on U.S.-Mexico agricultural trade depends crucially on what the agreement includes. The removal of only tariff barriers, for example, would likely have only a small to moderate impact on trade in most agricultural commodities between the U.S. and Mexico for three reasons: (1) Mexico has already unilaterally eliminated or significantly reduced most tariffs on agricultural commodity imports, (2) U.S. tariffs on most agricultural commodity imports from Mexico, except fruits and vegetables, are already low or zero, and (3) the most restrictive barriers to agricultural commodity trade between the two countries are non-tariff barriers, including quantitative import controls (Mexican import licensing regulations and U.S. import quotas), internal producer price supports and subsidies, and a divergence between U.S. and Mexican commodity grades and standards,

chemical use regulations, food residue regulations, insect and disease control standards, sanitary and phytosanitary regulations, and similar regulations.

Fifth, only tariffs and some quantitative restrictions are likely to be eliminated as part of a U.S.-Mexico FTA because: (1) the U.S. will likely reserve discussion of internal price supports for the GATT negotiations, (2) the issues relating to harmonization of agriculture and food standards, grades, and other regulations are sufficiently intractable that agreement on many of those issues is not likely in the current negotiations, and (3) several politically sensitive quantitative restrictions are not likely to be eliminated, such as the Mexican import licensing requirement for corn and the U.S. section 22 import quotas.

Sixth, a U.S.-Mexico FTA will likely enhance the existing competitive advantage of some agricultural commodities in both countries but negatively affect the advantage currently enjoyed by others. The extent of an FTA impact on the existing pattern of competitive advantage in U.S.-Mexico agricultural trade depends crucially on several factors, including not only the comprehensiveness of the agreement but also the impact of any FTA on Mexican economic growth and the influx of foreign investment capital. An FTA that generates a sufficient rate of economic growth in Mexico to sustain long-term growth in Mexican demand for agricultural commodities could provide the basis for adjustments and investments in U.S. agriculture to service a growing Mexican market over time. Such growth, however, would likely also stimulate domestic and foreign investment in Mexican agricultural production and processing to meet the growing needs of the domestic Mexican market. Absent significant demand growth, however, the Mexican market will likely continue to be serviced by local suppliers to a large extent with little or no significant increase in capital investments or technology improvements. Without additional foreign investment capital to lift the current constraints defined by the inadequate existing capacity, technology, and infrastructure in Mexico, the consequences over the long run could be a slow decline in any agricultural competitive advantage that Mexico may have gained through economic reform and the unilateral liberalization process.

Seventh, the nature, extent, and composition of future U.S.-Mexico agricultural trade will be defined in large part by the success of the Mexican government policy strategy for the Mexican agricultural and agribusiness sectors. Also, continued growth in agricultural trade between the two countries will likely force continued evolution of Mexican agricultural policy. The Mexican government plan for agriculture and agribusiness outlines several key strategic targets within Mexico, including: (1) the land tenure system, (2) agricultural inputs, (3) agricultural credit, (4) water resources, (5) domestic and international marketing and prices, (6) agribusiness and rural industries, and (7) the role of the government in agricultural processing and marketing.

Eighth, if effectively implemented, the net impact of recent Mexican land reform legislation to eliminate institutionalized inefficiencies created over many decades through the Mexican land tenure system could provide an incentive for more efficient, larger-scale farms in Mexico at the expense of traditional, less efficient *ejidos*. Farm size will likely increase and the total number of farmers will likely decrease since *ejidatarios* will have the option to sell their land. The size and number of corporate-owned farms will probably increase as well as the number of legal joint ventures with foreign companies.

Ninth, with or without an FTA, agricultural labor adjustments will be required by the recent changes in Mexican agricultural policy and growing in U.S.-Mexico agricultural trade. Increased imports of grains and other commodities from the U.S. will force Mexican rural labor to find alternative employment within or outside the Mexican agricultural sector. Where displaced agricultural labor relocates, however, will depend on several important factors including growth in productive activities in other Mexican agricultural sectors such as fruits and vegetables, growth in other sectors of the Mexican economy, and growth in the U.S. economy. Increased migration of undocumented workers to the U.S. will increase without significant economic growth in the non-agricultural sectors in Mexico to absorb the displaced workers. Because more than 2 million *ejidatarios* produce corn as their principal crop and over 90% of the *ejidos* produce at least some corn, the major displacement of Mexican farm labor would occur if an FTA required Mexico to liberalize corn imports and eliminate corn price supports and production subsidies. The consequence would be a large rural to urban agricultural labor migration and an almost equally huge displacement of surplus Mexican urban labor to the U.S. in search of employment.

Tenth, unless significant public and private investments are made, the outdated and inefficient Mexican production, transportation, marketing, storage, and distribution infrastructure will constrain the potential growth in Mexican agricultural exports to the U.S. as well as U.S. agricultural exports to Mexico. The Mexican transportation infrastructure, in particular, suffers from inadequate investment and inefficient public regulation and management.

Eleventh, FDI (foreign direct investment) in the Mexican agricultural production and food processing sectors has increased but still only accounts for about 0.1% and 1.8%, respectively, of the growing total FDI in the Mexico economy. Continued FDI growth in Mexican agricultural production and processing will depend largely on foreign investor confidence in the security and potential returns on their investments.

Twelfth, even though U.S. processed food exports to Mexico have increased in recent years, most U.S. food processors will likely continue to prefer direct investment strategies over exports to increase their presence in the Mexican market either by forming joint ventures with Mexican firms or by establishing Mexican affiliates. Although a U.S.-Mexico FTA will provide additional opportunities for continued investment by U.S.-based food processing firms in Mexico, U.S. food processors will continue to be lured to Mexico even without an FTA by Mexican economic reforms, unilateral liberalization by Mexico, changes in Mexican investment, foreign ownership, and land tenure laws, and the enticings of the Mexican government. Rather than a relocation of operations, however, most U.S.-investment in the Mexican food processing industry will likely be an expansion of activities to service the growing Mexican market. In general, U.S. food processing firms investing in Mexico appear to be more concerned about Mexico as a potential market for their products rather than as a "platform" for export sales back into the U.S.

Finally, an inflow of new investments and technologies will be critically needed in Mexico to promote labor-intensive economic activities as U.S.-Mexico agricultural trade grows and as the Mexican land tenure system evolves to allow larger average size of farm. Otherwise, massive agricultural labor displacement could be the result with all the attendant implications for unemployment and Mexican labor migration to the United States. Despite the critical need for public investment in the modernization and development of the Mexican agricultural sector, Mexico continues to seriously underinvest in agricultural research and technology development programs in terms of both fiscal and human resources.

REFERENCES

- Alvarez, J.R., "Los Estados Mexicanos Ribereños del Pacífico," *Comercio Exterior*, Vol. 40, No. 7, July 1990, pp. 667-683.
- Basañez, M. *El Pulso de los Sexenios: 20 Años de Crisis en México*. Mexico City: Siglo Veintiuno Editores, 1990.
- Bassols, A., "Recursos Naturales de México: Teoría, Conocimiento y Uso," *Editorial Nuestro Tiempo*, 7th edition, 1977.
- Bean, D.F., B. Edmonston, and J.S. Passel. *Undocumented Migration to the United States: IRCA and the Experience of the 1980s*. Washington, D.C.: The Urban Institute Press, 1990.
- Brown, R.N. and N. Suarez, "Fresh Fruits and Vegetables: Some Characteristics of the U.S. Market," U.S. Department of Agriculture, Economic Research Service, Agricultural and Trade Analysis Division, June 1988.
- Caravias, J., "Recursos Naturales y Desigualdades," in R. Cordera and C. Tello, eds. *La Desigualdad en México*. Mexico City: Siglo Veintiuno Editores, 1984.
- CESPA-SARH-ONU/CEPAL, "El Desarrollo Agropecuario de México," Tomo VIII, Mexico City, Mexico, 1982.
- Comité Reguladora de Hortalizas y Frutas del Estado de Sinaloa (CORHFES), "1989-1991 National Tomato Shipments," Sinaloa, Mexico, 1991.
- Confederación Nacional de Productores de Hortalizas (CNPH), "Boletín Anual Temporada, 1988-89," November 1989.
- Congressional Research Service (CRS), "Report on Inter-American Relations," 100th Congress, 2D Sess. (S.PRT. 100-168), 1988.
- Connor, J.M., "Foreign Investment in Mexico's Food-Manufacturing Industries," in B.F. Johnston, et. al., eds. *U.S.-Mexico Relations: Agriculture and Rural Development*. Stanford, CA: Stanford University Press, 1987.
- Cook, R.L., et. al., "Fruit and Vegetable Issues," *North American Free Trade Agreement: Effects on Agriculture*, Volume IV, American Farm Bureau Research Foundation Project, 1991.
- Dupnick, F.S. and C.R. Harston, "United States - Mexican Trade: An Examination of Agricultural and Nonagricultural Trade Policies and Their Implications," Department of Agricultural Economics, Texas Agricultural Experiment Station, Texas A&M University, Departmental Information Report No. 82-2, 1982.
- Flores, E., "Tratado de Economía Agrícola," in *Fondo de Cultura Económica*, Fourth Reprinting, 1976.
- Food and Agriculture Organization of the United Nations (FAO), "Agricultural Protection: Domestic Policy and International Trade," FAO Conf. Doc. C73/LIM/9, 1973.
- Food and Agriculture Organization of the United Nations (FAO), "Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment," FAO Conf. Doc. C75/LIM/2, 1975.

- Fuller, S.W., *The U.S.-Mexico Free Trade Agreement: Agricultural Transportation Issues*, Texas Agricultural Market Research Center Report No. IM-7-91, Texas A&M University, College Station Texas, April 1991.
- Fuller, S.W. and C.R. Hall, *The U.S.-Mexico Free Trade Agreement: Issues and Implications for the U.S. and Texas Fresh Vegetable/Melon Industry*, Texas Agricultural Market Research Center Report No. IM-2-91, Texas A&M University, College Station Texas, April 1991.
- General Agreement on Tariffs and Trade (GATT), Geneva, Switzerland, 1986.
- Gomez de la Cruz, M.A., R. Schwentesius R., and A. Merino S., "Principal Indicators of the Vegetable Production Subsector in Mexico for the Negotiations for a Free Trade Agreement," Universidad Autonoma Chapingo, Chapingo, Mexico, December 1991.
- Gordillo de Anda, G., "La Politica de Modernización del Campo: Estrategia de Desarrollo Agroindustrial y Acuerdo de Libre Comercio," Speech given at U.S.-Mexico Agribusiness Conference on Free Trade, San Antonio, Texas, May 17, 1991.
- Grennes, T., J. Hernandez E., B. Krissoff, J. Matus G., J. Sharples, and C. Valdes, "An Analysis of a United States-Canada-Mexico Free Trade Agreement," Commissioned Paper No. 10, International Agricultural Trade Research Consortium, November 1991.
- Hall, K. and C. Livas-Hernandez, *Mexican Agriculture Databook*, Texas Agricultural Market Research Center Information Report No. IR-3-90, Texas A&M University, College Station Texas, September 1990.
- Handy, C.R., "Mexico's Food Industry Draws U.S. Investment," *Agricultural Outlook*, No. AO-184, U.S. Department of Agriculture, Washington D.C., April 1992, pp. 29-31.
- Hayami, Y. and V.W. Ruttan. *Agricultural Development: An International Perspective*. Baltimore: The Johns Hopkins Press, 1971.
- Instituto Nacional de Estadística Geografía e Informática (INEGIa), "Datos Básicos de la Geografía de México," Secretaría de Programación y Presupuesto, Mexico City, Mexico, various years.
- Instituto Nacional de Estadística Geografía e Informática (INEGIb), "Agenda Estadística," Secretaría de Programación y Presupuesto, Mexico, various years.
- Instituto Nacional de Estadística Geografía e Informática (INEGIc), "El Sector Alimentario en México," Dirección de Estadísticas Sectoriales, Estatales, y Regionales, Mexico City, Mexico, various years.
- Instituto Nacional de Estadística Geografía e Informática (INEGIId), "Anuario de Estadísticas Estatales," Secretaría de Programación y Presupuesto, Mexico City, Mexico, various years.
- Junco, A., "The Americas: The Case for an Internal Mexican Free-Trade Agreement," *The Wall Street Journal*, March 22, 1991, p. A11.
- KRF Newswire Release, "U.S. Agrees Mexico Can Keep Long-Term Corn Tariffs," April 8, 1992.
- Landero, A.D., "An Economic Appraisal of the Deregulation Process in the Mexican Transport Market," *Journal of the Transportation Research Forum*, Vol. XXXI, No. 1, 1990.

- Lloyds Ports of the World*. Cochester, Essex, U.K.: Lloyds of London Press, Ltd., 1989.
- Mielke, M.J., "Government Intervention in the Mexican Crop Sector," Economic Research Service, Agriculture and Trade Analysis Division, U.S. Department of Agriculture, Staff Report No. AGES89-40, September 1989.
- Mielke, M.J., "The Mexican Wheat Market and Trade Prospects," Economic Research Service, Agriculture and Trade Analysis Division, U.S. Department of Agriculture, Staff Report No. 9052, September 1990.
- Morett S., J.O., "Alternativas de Modernización del Ejido," 1st ed., Instituto de Proposiciones Estratégicas, May 1991.
- Nacional Financiera (NFa), "Resultados de la Encuesta Nacional Agropecuaria Ejidal," *El Mercado de Valores*, No. 15, August 1, 1990.
- Nacional Financiera (NFb), *La Economía Mexicana en Cifras*, Mexico City, Mexico, various editions.
- Poder Ejecutivo Federal (PEF), "Carlos Salinas de Gortari: Primer Informe de Gobierno, 1989 Anexo," 1989.
- Polanco, E. R., "La Crisis y la Alimentación Nacional: Opciones de Desarrollo," *Comercio Exterior*, Vol. 40, No. 9, México City, Mexico, September 1990.
- Polyconomics, "Mexico 2000," Polyconomics, Inc. July 2, 1990.
- Represas, C.E. and O.V. Ferrer, "The North American Free Trade Agreement: Its Impact on Direct Foreign Investment in Mexico," *Direct Foreign Investment*, Banco Nacional de México, Mexico City, Mexico, October 1991.
- Roberts, D.H. and M.J. Mielke, "Mexico: An Export Market Profile," U.S. Department of Agriculture, Economic Research Service, Foreign Agricultural Economic Report No. 220, 1986.
- Robinson, S., M.E. Burfisher, R. Hinojosa-Ojeda, and K.E. Thierfelder, "Agricultural Policies and Migration in a U.S./Mexico Free Trade Area: A Computable General Equilibrium Analysis," Working Paper No. 617, California Agricultural Experiment Station, Giannini Foundation of Agricultural Economics, University of California at Berkeley, December 1991.
- Rosson III, C.P. and F.J. Adcock, *The U.S.-Mexico Free Trade Agreement: Issues and Implications for the U.S. and Texas Citrus Industry*, Texas Agricultural Market Research Center Report No. IM-3-91, Texas A&M University, College Station Texas, April 1991.
- Rosson III, C.P. and A.L. Angel, *The U.S.-Mexico Free Trade Agreement: General Economic Issues*, Texas Agricultural Market Research Center Report No. IM-12-91, Texas A&M University, College Station Texas, April 1991.
- Rosson III, C.P., E.E. Davis, E. Segarra, A.L. Angel, B.K. Schulthies, D. White, E.A. McClain, and H. Harris, Jr., "Livestock and Dairy Issues," *North American Free Trade Agreement: Effects on Agriculture*, Volume II, An American Farm Bureau Research Foundation Project, 1991.
- Rosson III, C.P., B.K. Schulthies, and D. White, *The U.S.-Mexico Free Trade Agreement: Issues and Implications for the U.S. and Texas Livestock and Meat Industry*, Texas Agricultural Market

Research Center Report No. IM-5-91, Texas A&M University, College Station, Texas, April 1991.

Salazar, D., "Programa Demostrativo de Riego Presurizado: Experiencias en la Comarca Lagunera," *Boletín Informativo*, Vol XXII, No. 212, FIRA - Banco de México, Mexico City, Mexico, 1971.

Salinas de Gortari, C., "En Marcha, la Reforma que Necesita el Campo Mexicano," Text of the initiative of the President of Mexico, for reforming Article 27 of the Constitution of Mexico, November 1991.

Secretaría de Agricultura y Recursos Hidráulicos (SARHa), "Indicadores del Sector Agropecuario y Forestal," Subsecretaría de Política Sectorial y Concertación, Mexico City, Mexico, 1989.

Secretaría de Agricultura y Recursos Hidráulicos (SARHb), "Informe de los Fenómenos Meteorológicos Significativos para la Agricultura," Dirección General del Servicio Meteorológico Nacional, Vol. II, 1984-12, 1984.

Secretaría de Agricultura y Recursos Hidráulicos (SARHc), "Programa Nacional de Modernización del Campo, 1990-1994," *Comercio Exterior*, Vol. 40 No. 10, October 1990, pg. 987-1008.

Secretaría de Agricultura y Recursos Hidráulicos (SARHd), "Anuario Estadístico de la Producción Agrícola Nacional," Dirección General de Estudios, Información, y Estadísticas Sectoriales, Mexico City, Mexico, various issues.

Secretaría de Agricultura y Recursos Hidráulicos (SARHe), Personal communication with H.E. García R., Director, Subsecretaría de Planeación, Dirección General de Estadísticas, Subdirección de Diseño de Sistemas, March 1991.

Secretaría de Agricultura y Recursos Hidráulicos (SARHf), "Programas Siembra - Exportación, Temporada 1980-81," Subsecretaría de Agricultura y Operación, Mexico City, Mexico, 1981.

Schulthies, B.K. and R.B. Schwart, *The U.S.-Mexico Free Trade Agreement: Issues and Implications for the U.S. and Texas Dairy Industry*, Texas Agricultural Market Research Center Report No. IM-10-91, Texas A&M University, College Station Texas, April 1991.

Slater, L.E., "Food: U.S. Perspective," in S. Weintraub, et. al., eds. *U.S.-Mexican Industrial Integration: The Road to Free Trade*. Boulder, Colorado: Westview Press, 1991.

Tangermann, S., T. Josling, and S. Pearson, "International Negotiations on Farm Support Levels: The Role of PSEs," IATRC Working Paper No. 87-3, International Agricultural Trade Research Consortium, Stanford University, June 1987.

Taylor, J.M., *The U.S.-Mexico Free Trade Agreement: Issues and Implications for the U.S. and Texas Cotton Industry*, Texas Agricultural Market Research Center Report No. IM-6-91, Texas A&M University, College Station Texas, April 1991.

Thompson, G.D. and P.L. Martin, "The Potential Effects of Labor-Intensive Agriculture in Mexico on United States-Mexico Migration," Commission for the Study of International Migration and Cooperative Economic Development, Working Paper No. 11, Washington, D.C., December 1991.

- Turrent Fernández, A., "Research and Technology for Mexico's Small Farmers," in B.F. Johnston, et. al., eds. *U.S.-Mexico Relations: Agriculture and Rural Development*. Stanford, CA: Stanford University Press, 1987.
- U.S. Department of Agriculture (USDAa), "World Agricultural Trends and Indicators, 1970-1989," Economic Research Service, Statistical Bulletin No. 815, September 1990 as updated and revised through personal communication with USDA analysts.
- U.S. Department of Agriculture (USDAb), "Foreign Agricultural Trade of the U.S. (FATUS)," Economic Research Service, various issues.
- U.S. Department of Agriculture (USDAc), Agricultural Affairs Office, Mexico City, various GEDES voluntary reports, various issues.
- U.S. Department of Agriculture (USDAd), "World Cotton Situation," Foreign Agricultural Service Circular, FC series, various issues.
- U.S. Department of Agriculture (USDAe), "Horticultural Products Review," Foreign Agricultural Service Circular, FHORT series, various issues.
- U.S. Department of Agriculture (USDAf), "Fresh Fruit and Vegetable Shipments," Agricultural Marketing Service, FVAS series, Fruit and Vegetable Division, Market News Branch, Washington, D.C., various issues.
- U.S. Department of Agriculture (USDAg), "Marketing Mexico Fruits and Vegetables, 1988-1989," Agricultural Marketing Service, Fruit and Vegetable Division, McAllen, Texas.
- U.S. Department of Agriculture (USDAh), "Mexico and Its Agriculture: A Developing Market," Office of the Counselor for Agricultural Affairs, U.S. Embassy, Mexico City, Mexico, June 1982.
- U.S. General Accounting Office (GAO), "U.S.-Mexico Trade: Trends and Impediments in Agricultural Trade," Briefing Report to the Chairman of the Committee on Agriculture, House of Representatives, GAO/NSIAD-90-85BR, January 1990.
- U.S. International Trade Commission (USITC), Washington, D.C., various reports, 1990-1991.
- Webb, A. and K. Gudmunds, "PS&D View," U.S. Department of Agriculture, Economic Research Service, Washington, D.C., 1990.
- World Bank. *World Development Report*. New York: Oxford University Press, various editions.